

Previous Consent No. _____
 Charge No. _____
 Client / NAV No. _____
 Consent No. _____

Administration Form 'A'

This application is for:	
A New Consent Deposit of \$1150.00	<input type="checkbox"/>
A Change to an Existing Consent Deposit of \$575.00	<input type="checkbox"/>
A Replacement of an Expiring Consent Deposit of \$1150.00	<input checked="" type="checkbox"/>
A Permitted Activity	<input type="checkbox"/>
<i>All fixed deposits are Inclusive of GST (GST # 051 227 875)</i>	

Please note: if your consent is notified additional deposits are required, We will advise you if your application will be notified once assessed.

INSTRUCTIONS: PLEASE READ

1. An application must consist of an Administration **Form 'A' and Form 'B'** (Technical information relevant to the type of activity being applied for).
2. If you have any questions please contact Council's Consents Advisor, on 06 833 8090, or email: ConsentAdvisor@hbrc.govt.nz
3. Your deposit must accompany your application.
4. Fill in all fields or write not applicable if appropriate.
5. Post, Email or deliver the application along with any other supporting information and the required deposit to: Consent Advisor, Hawke's Bay Regional Council, Private Bag 6006, NAPIER 4142. 159 Dalton Street, Napier or via email: ConsentAdvisor@hbrc.govt.nz
6. For payments via online banking, please email the Consent Advisor with the applicant's name (from section 1.4 of this form), postal address and ask for a payment reference,
 - a. Account BNZ - 02 0700 030 2819 00
7. Please note, as Council does not generally create invoices for application deposits, this front sheet can be used in lieu of an Invoice in most circumstances, GST information is shown in the top box.
8. Maps, map reference, Legal descriptions and existing consent information can be found using Councils online map portal at hbrc.govt.nz (bottom of home page, consent maps)
9. **Ensure you have signed the form and included/arranged for payment of the deposit before submitting.**

1. ADMINISTRATION DETAILS

DP020333A, DP030579A, DP981039Lb, DP981040L, DP981041L, DP981043Ld & DP981044Ad

1.1 **Existing Consent number** _____ or NA/New consent For replacement of expiring consents, do you agree that your application can be processed any time before the current expiry date: Yes 1.2 **No. of consent applications:** Single Consent Multiple Consents1.3 **Type of Resource Consent(s) being applied for:**

- Bore Permit Water Permit Land Use Permit
 Discharge Permit Discharge from on-site Waste Water Systems to land
 Other _____

1.4 **Applicant Details:**

Who will the consent be issued to (The Applicant):

 Private Person(s) Company Trust Partnership**Company Name** Silver Fern Farms Management Limited skip to Q1.5**Trust/Partnership Name** _____**The Full legal names** (first, middle & last names) of the **Private Person(s)/Trustee/Partners**

Applicant 1 _____

Applicant 2 (if applicable) _____

Applicant 3 (if applicable) _____

NB* For Trusts & Partnerships, the full legal names of all trustees/partners are required above (each party is an applicant).

1.5 **Main Contact Person** Ali Johnstone, Environmental Advisor (Planning) - Group Environmental1.6 **Applicant's Postal address** _____ Telephone Pvt. _____PO Box 941Bus. 03 972 5034DunedinMob. 027 496 6129

*E-mail _____

Post Code: 9054 alison.johnstone@silverfernfarms.co.nz

*if an email address is provided, this will be the default address for service of all documents

1.7 **Address for service.** This is a consultant or other person handling the application on your behalf - leave blank if not applicable, skip to Q2.1.

Name _____ Telephone Pvt. _____

Address _____ Bus. _____

_____ Mob. _____

*E-mail _____

Post Code: _____

*if an email address is provided, this will be the default address for service of all documents

Who is the final invoice (bill) to be sent to? The Address for service The Applicant

2. SITE DETAILS

- 2.1 **Property Owner's Name & Address** Telephone Pvt. _____
 Same as Applicant (*skip to next question*) Bus. _____
 _____ Mob. _____
 _____ E-mail _____

- 2.2 **Location of Activity** (The Street Address of the property)
 Fraser Road, Takapau (Silver Fern Farms Takapau)

- 2.3 **Map reference** (NZMG Easting and Northing) _____
- 2.4 **Do you have an existing resource consents on this property?** Yes No
 If yes, consent ID no(s). DP020333A, DP030579A, DP981039Lb, DP981040L, DP981041L,
DP981043Ld & DP981044Ad, WP981038Tb
- 2.5 **Legal Description of Property(s) at site of take/discharge** (Lot and DP number)
Lot 1 DP3357, Lot 1 DP24978, Lot 4 DP6204, Lot5 DP6204, Section 15 Maharakeke
Settlement
- 2.6 **For water takes: Legal Description of Property(s) at site of use**

- 2.7 **Please provide a site map** clearly showing points where the activity will occur. A Google map or HBRC Map (from hbrc.govt.nz) is acceptable.
 See attached AEE.

3. PROPERTY OWNERSHIP

- Is the Applicant the owner of all properties that this application applies to? Yes No
If Yes, move onto Q4
- If **No**, have you discussed the application with the property owner(s)? Yes No
- Have the owner(s) given their approval for the application? Yes No
- If yes, have the owners fill in the approvals section below:

To be completed by the **Property Owner – Only if different from applicant:**
 An application to undertake an activity on your property is being made. Please confirm your approval for the activity to occur on your property by signing below. Please ensure you have reviewed forms A & B and/or any attached AEE document.

Signature of Property owner: _____

Name: _____ Date: _____

Please print full name of person who signed above.

Should you have any questions with regards to the giving of approval for this application and the legal implications, please contact the Council's Consents Advisor on 06 833 8090.

4. GENERAL INFORMATION

4.2 Costs of Debt Recovery

It is agreed by the consent holder that it is a term of the granting of this resource consent that all costs incurred by the Council for, and incidental to, the collection of any debt relating to this resource consent, whether as an individual or as a member of a group, and charged under s36 of the Resource Management Act, shall be borne by the consent holder as a debt due to the Council, and for that purpose the Council reserves the right to produce this document in support of any claim for recovery.

4.3 Information held by Hawke's Bay Regional Council

Please note that all information collected and held by the Hawke's Bay Regional Council is public information under section 2 of the Local Government Official Information and Meetings Act 1987 (LGOIMA), as such any and all information may be requested by a third party. Access to information held by Council is administered in accordance with LGOIMA and the Privacy Act 1993. If you have any concerns over the disclosure of any aspect of your consent or personal/property details, either in person or electronically, you must raise your concern in writing to The Council and detail what "good reason" you believe there is for withholding information pursuant to section 7 of LGOIMA. Council will assess your request and advise you of any decision made. Please note that no person has the right of veto over any information held by Council. Council intends for all information it holds, submitted without a request for nondisclosure (as above), to be public, and accessible to any persons who requests it pursuant to LGOIMA. If you require more information on the situations that information may be provided, please contact the Councils Consents Advisor.

4.4 Additional Information Required

You must also complete a relevant Form 'B' – Assessment of Environmental Effects, and attach to this Form A before submitting.

Please indicate the total number of additional documents attached to this application:

Relevant Form B: Required

Separate AEE document(s): or NA

Map(s): Required

Other: _____ or NA

Deposit Method of payment Direct Deposit e.g. direct deposit
Remittance Advice attached

4.5 Applicants Signature

To be completed by the Applicant: Application is hereby made for the consent(s) detailed in both forms A & B and any attached additional information. I have read, understood and agree to the information provided in this application. All information provided is true and correct.

Signature of applicant or authorised agent:  _____

Name: Daryn Jemmett, Group Environmental Manager Date: 25 June 2018

Please print full name of person who signed above.

The application will not be processed until the deposit is received. Additional costs will be charged when the final cost of processing is known



Office Use

Previous Consent No. DP981039Lb
Charge No.
Client No.
Consent No.

Form 'B' - Assessments of Environmental Effects
Application to Discharge Contaminants

Applicant Name: _____

Applicant Name : _____ (from form A, Q1.4)

1. Details of the Changes of Conditions Requested
or NA New consent [] (move to Q 2)

1.1 What is the number of the consent you wish to change? _____

1.2 Attach a copy of the consent, with annotations showing the changes you are requesting, or state specifically the changes you wish to make below.

Table with 2 columns: Condition #, Change Requested. Multiple rows of empty lines for data entry.

Now go through the form and confirm the details of your discharge, as some will change as a result of the change of conditions.



**SILVER
FERN™
FARMS**

Silver Fern Farms - Takapau

Consent Application and Assessment of Environmental Effects

100% MADE OF NEW ZEALAND

REPORT TITLE: Consent Renewal Application and Assessment of Environmental Effects

OPERATION: Silver Fern Farms - Takapau

DATE: 27 June 2018 - FINAL

PREPARED BY: Group Environmental



AEE Primary Contact:	
Silver Fern Farms – Group Environmental	
Phone:	027 496 6129
Email:	alison.johnstone@silverfernfarms.co.nz
Contact Person:	Environmental Advisor (Planning), Group Environmental

APPLICATION Primary Contact:	
Silver Fern Farms (Takapau)	
Phone:	06 858 6016
Email:	graeme.orviss@silverfernfarms.co.nz
Contact Person:	Silver Fern Farms Takapau Acting Plant Manager

ADDRESS FOR SERVICE:	
Silver Fern Farms (Attention: Group Environmental)	
PO Box 941	
DUNEDIN 9054	



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1 INTRODUCTION

1.1 Background

Silver Fern Farms owns and operates a multi chain, mixed species meat processing operation near the township of Takapau (*Silver Fern Farms Takapau*) in Central Hawkes Bay.

The processing plant and key service activities are principally situated on Fraser Road. This includes buildings, car parks, hardstand areas, gas-fired boilers, a wastewater treatment plant and open spaces. Land support activities occur on company owned land within proximity to the processing plant. This includes holding of stock as required to support the processing operation, discharge of treated domestic wastewater and treated processing wastewater / stockyard solids to land as a nutrient source for a cut-and-carry operation.

Activities at Silver Fern Farms Takapau have been operating under various consents granted by the Hawkes Bay Regional Council (HBRC) for a number of years. All of these consents are subject to operating conditions and are closely monitored and regularly reported to HBRC. The consents are held under delegated authority by Silver Fern Farms Management Limited (*the Applicant*).

Table 1.1 below summarises the resource consents held for the Silver Fern Farms Takapau site. As shown, several key resource consents which are essential for the on-going operation of plant activities expire in December 2018. Silver Fern Farms wishes to continue these activities; therefore, replacement consents are being sought.



Table 1.1: Existing Resource Consents held by Silver Fern Farms Takapau		
Consent Number	Activity	Expiry
CC120130L	To discharge stockyard solids to Blocks F and G under a Certificate of Compliance.	N/A
* DP020333A	To discharge contaminants to air from rendering, refrigeration and stockyards.	31 Dec 2018
* DP030579A	To discharge products of combustion into the atmosphere from gas fired boilers.	31 Dec 2018
* DP981039Lb	To discharge sheepyard solids to land.	31 Dec 2018
* DP981040L	To discharge secondary treated sewage from an oxidation pond onto land.	31 Dec 2018
* DP981041L	To discharge stormwater to land where it may enter water, after passing through a detention pond.	31 Dec 2018
* DP981043Ld + DP981044Ad	To discharge screened wastewater to land and odorous compounds and aerosols to air via irrigation.	31 Dec 2018
* WP981038Tb	To take and use groundwater from six groundwater bores for meat processing purposes.	31 Dec 2018
DP940241L	To discharge contaminants onto or into land from a disused offal pit in circumstances which may result in those contaminants entering water.	31 May 2029
* Consents requiring renewal.		

In order that these activities may continue while this application is processed, the Application has been made in accordance with s.124 RMA.

Since meat processing at the site has been undertaken since 1981, some 37 years, the use of resources and effects on the receiving environment are well understood and managed.

The purpose of this Assessment of Environmental Effects (AEE) is to look at the resource consents requiring renewal (outlined in Table 1.1 and Appendix One) and establish whether their continuation will result in adverse effects on the environment. In addition, the application reflects the modifications made and improved environmental outcomes that have taken place over the term of the existing consents.

1.2 Outline of Proposal to Renew Existing Resource Consent

The key elements of the Application are based on embedding improvements to operations which have been carried out over the term of the existing consent that seek to:

- Continue to discharge wastewater and stockyard solids to land as a nutrient source for a cut-and-carry operation;



- Continue to discharge contaminants to air from various activities of a meat processing plant and ancillary activities including boiler operations;
- Continue to discharge treated domestic wastewater from an oxidation pond to land;
- After passing through a detention pond, continue to discharge stormwater to land where it may enter water; and
- Remove rendering and blood drying activities from consented activities, reflecting the closure of these departments.

1.3 Site Features

Silver Fern Farms Takapau is a mixed-species operation that predominantly processes lamb / sheep, bobby calves, and from time-to-time goats. All product is largely destined for export markets.

Upon receipt, stock is held within the animal assembly (stockyards) before being processed, dressed and trimmed in the primary butchery (slaughterboard). Carcasses are then sprayed with fresh water and left to cool in the cold chain (cooling floor) before being transferred to the secondary butchery (boning room) where they are broken down and packed into cartons. Added value cuts are packed into cartons in the tertiary butchery (retail room). Offal is transferred to internal products to be packed into cartons or bins. Cartons are then either frozen or chilled until loaded out for distribution.

Following the closure of the onsite rendering / blood-drying facilities in 2014, all blood and renderable material from the Silver Fern Farms Takapau operation is sent offsite to purpose built and appropriately managed third party facilities for further processing. As the plant does not operate a fellmongery, washed and cooled skins / hides are sent offsite for further processing.

Wastewater generated from onsite activities is discharged to land via spray irrigation, with nutrients managed through a cut-and-carry operation. Solids generated within the animal assembly, generally consisting of sheep pellets, are spread onto Company owned land using a tractor drawn muck spreader.

The plant generally operates day and night shifts for approximately eight months of the year, with a third chain added during peak season. The site is closed for a short



maintenance shutdown period usually scheduled in May. However, given the nature of the industry and Silver Fern Farms ability to respond rapidly to market changes, it is possible that production throughput at the site could change at short-notice.

The workforce generally comes from local communities across Central Hawkes Bay, with some travelling from as far as Hastings and Napier. Silver Fern Farms is one of the largest employers in the area, employing up to 1,100 staff at peak times; peak staffing numbers also vary depending on the species being processed and the market product is being prepared for.

1.4 History of Silver Fern Farms Takapau

The Takapau site (*the Operating Site*) commenced operations in 1981 by the then Hawke's Bay Farmers Meat Company. In 1986, the meat processing plant was sold to the then Richmond Limited. In 2005, the Primary Producers Co-operative Society Limited (latterly PPCS Ltd) acquired the operations. In 2008, PPCS changed its trading name to Silver Fern Farms Limited. In 2015, Silver Fern Farms agreed to a 50/50 partnership with China's leading meat processor Shanghai Mailing.

Since the start of the processing plant, the disposal of wastewater has always been to land. Initially the land disposal of wastewater was carried out onto a small parcel of land by border dyke irrigation before progressively changing to spray irrigation.

In 2008, Silver Fern Farms undertook a review of its land-based activities and their potential effects on groundwater. As a result, a subsequent resource consent variation was granted in 2012.

The variation saw Silver Fern Farms make a number of significant improvements to its land based wastewater irrigation operation. These changes included:

- Purchasing additional land to bring all wastewater irrigation activities under Company control;
- Installing extra monitoring bores up and down gradient of operations to better understand effects, if any, of activities; and
- Implementing higher level of operational control on irrigation activities, systems and monitoring.



1.5 Document Layout

This AEE provides such detail fitting with the scale and significance of the effects that Silver Fern Farms Takapau operations may have on the receiving environment, while recognising this is an existing activity and the short-term replacement consent being sought. This AEE has been prepared in accordance with the Fourth Schedule of the Resource Management Act 1991 (RMA), and comprises of the following sections:

Section 1:	Background and details about the applicant.
Section 2:	Outlines the activities requiring consent renewal.
Section 3:	Outlines the existing environment.
Section 4:	Provides details on the land-based disposal of wastewater and stockyard solids, associated mitigation measures in place and an assessment of environmental effects.
Section 5:	Provides details on the land-based disposal of domestic wastewater via border dyke, associated mitigation measures in place and an assessment of environmental effects.
Section 6:	Provides details on potential stormwater discharges to land that may enter water, associated mitigation measures in place and an assessment of environmental effects.
Section 7:	Provides details on potential discharges to air from meat processing operations and ancillary activities, associated mitigation measures in place and an assessment of environmental effects.
Section 8:	Provides an explanation of the relevant legal and planning provisions applicable to the application.
Section 9:	Provides detail regarding potential alternatives to the activities.
Section 10:	Outlines consultation undertaken with potentially affected parties.
Section 11:	Conclusion.
Section 12:	Outlines notification of the renewal.
Section 13:	Proposed consent conditions.
Appendices:	Presents documents referred to within this AEE.



2 ACTIVITIES REQUIRING CONSENT RENEWAL

2.1 The Applicant

Silver Fern Farms (*Silver Fern Farms or the Company*) is New Zealand's leading processor, marketer and exporter of premium quality lamb, beef, venison and associated products, with the Head office based in Dunedin.

As a leading food producer, Silver Fern Farms takes pride in its commitment to actively caring for the environment and managing environmental matters as an integral part of the business. This is not just the right thing to do, but also essential in meeting the expectations of our suppliers, customers and consumers.

Silver Fern Farms Management Limited is a subsidiary of Silver Fern Farms Ltd. It is the applicant in relation to this application for renewal and the consent holder of the existing consents.

2.2 The Application in Brief

This application is for the replacement of consents for existing activities due to expire in December 2018 (as set out in Table 1.1) and not for new activities. Because of this, there is a good database of information that has been generated over the term of the consent that largely obviates the need to try and predict effects as is the case for a consent application for new activities.

As discussed with the Hawke's Bay Regional Council (HBRC), Silver Fern Farms is seeking to lodge the renewal consent for groundwater abstraction and use in a separate application. The application and AEE was lodged by Pattle Delamore Partners Ltd (*PDP*) on 18 June 2018.

For this consent renewal, Silver Fern Farms engaged PDP to carry out an independent assessment of the activities and to assess potential effects. Whilst PDP were the principal consultant, they have utilised other specialist reports for different aspects of the assessment of effects on the environment. Parts of the report are referenced throughout this AEE, and a copy of the full report is appended as Appendix Two.



In light of this, activities associated with Silver Fern Farms Takapau for which replacement consents are required under this application are:

2.2.1 Discharge Permit – Treated Wastewater and Solid Organic Matter to Land (DP981039Lb / DP981043Ld & DP981044Ad)

Renewal of consent:

- To discharge contaminants onto land;
- To discharge contaminants onto land where they may enter water; and,
- To discharge contaminants to air from the land application of wastewater and stockyard solids.

At present, wastewater and stockyard solids are applied to several land blocks surrounding the processing plant. The land is utilised for treatment with crops removed in a cut-and-carry system.

2.2.2 Discharge Permit – Secondary Treated Domestic Wastewater to Land (DP981040L)

Renewal of consent:

- To discharge contaminants onto land;
- To discharge contaminants onto land where they may enter water;
- To discharge contaminants to air from the land application of wastewater.

At present, domestic wastewater undergoes secondary treatment within an oxidation pond before discharge to land via a border dyke system.

2.2.3 Discharge Permit – Discharge Contaminants to Air (DP020333A / DP030579A)

Renewal of consent:

- To discharge contaminants to air from general meat processing and ancillary activities;
- To discharge contaminants to air from the operation of gas-fired boilers and related ancillary activities.

It is important to note rendering and blood drying activities are no longer conducted onsite following disestablishment in 2014.



2.2.4 Discharge Permit – Discharge Stormwater to Land (DP981041L)

Renewal of consent:

- To discharge contaminants via stormwater onto land where they may enter water.

At present, stormwater from a sub-catchment and other influent water sources are directed to the non-potable pond. Water in this pond is reused onsite in various processes. Overflow from the pond, if any, may discharge overland along a grass channel before entering the Porangahau Stream.

2.3 Consent Lapsing Period and Term of Consent

Table 2.3 below identifies the maximum duration permitted by the RMA (s.123), and the associated term of consent sought by Silver Fern Farms.

Table 2.3: Term Sought for Renewed Consents		
Consent Type	Maximum Duration (RMA)	Consent Term Sought
Discharge Permit - Air	35	10
Discharge Permit - Wastewater / Stockyard solids to Land / Air / Water	35	10
Discharge Permit - Domestic Wastewater to Land / Air / Water	35	10
Discharge Permit - Stormwater to Land / Water	35	10

A ten-year consent term is being sought for all the above activities. Whilst a ten-year term will not provide economic certainty for continued operation of Silver Fern Farms Takapau, it is considered the minimum reasonable term given the uncertainty surrounding the Ruataniwha Water Storage Scheme and any potential for supplementary water.

If supplementary water becomes available, Silver Fern Farms may need to alter the current wastewater irrigation system and are hesitant to make a decision on this until we know the wider picture. In turn, it does not seem appropriate to apply for a longer term if a subsequent variation would be required in the short term. Once the matter of the availability of supplementary water becomes clear, this will determine whether any changes to irrigation methods are appropriate.



2.4 Property Legal Descriptions Associated with Activities

The Operating Site encompasses a total of 482 hectares made up of numerous titles as shown in Figure 2.4(a) below.

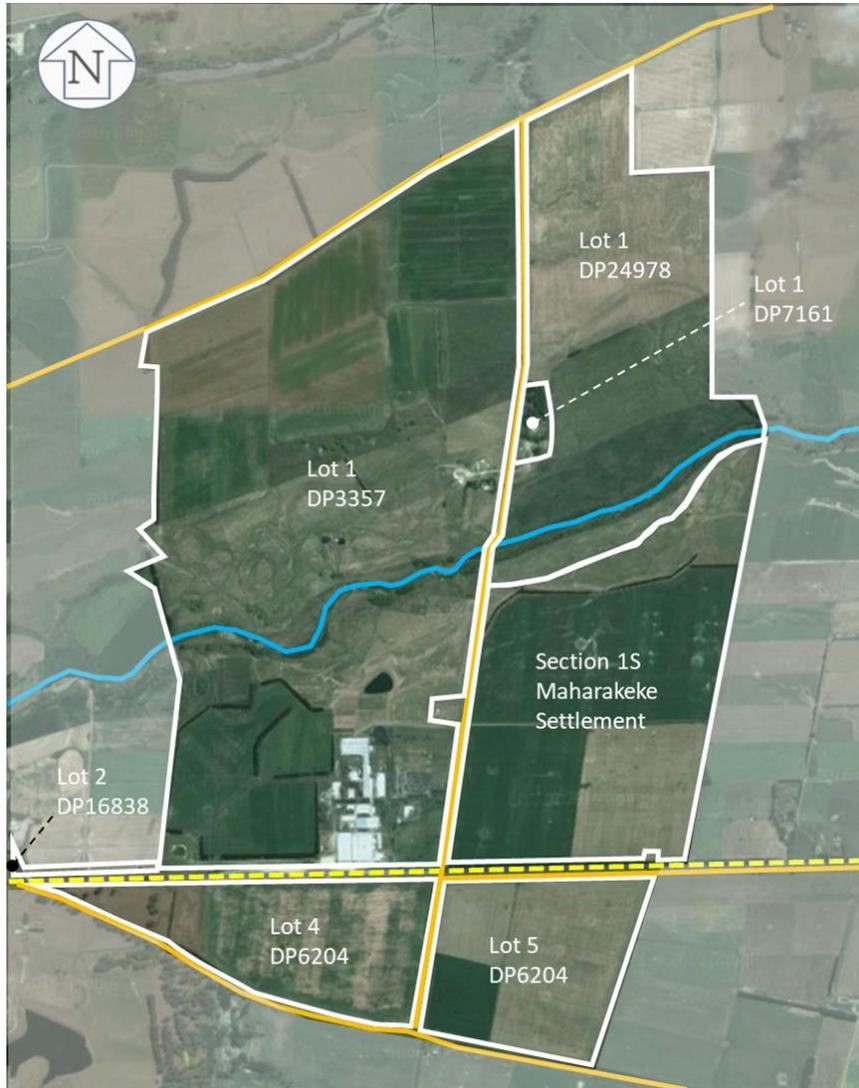


Figure 2.4(a): Indicative location of property land parcels.

Of this area, Silver Fern Farms lease Lot 2 DP16838 to a neighbouring property. Activities conducted on this land parcel are not included in this AEE as they are outside of the control of Silver Fern Farms.

As shown in Figure 2.4(b) below, the site and wider neighbouring area are zoned for rural land use pursuant to the Central Hawkes Bay District Plan 2003.

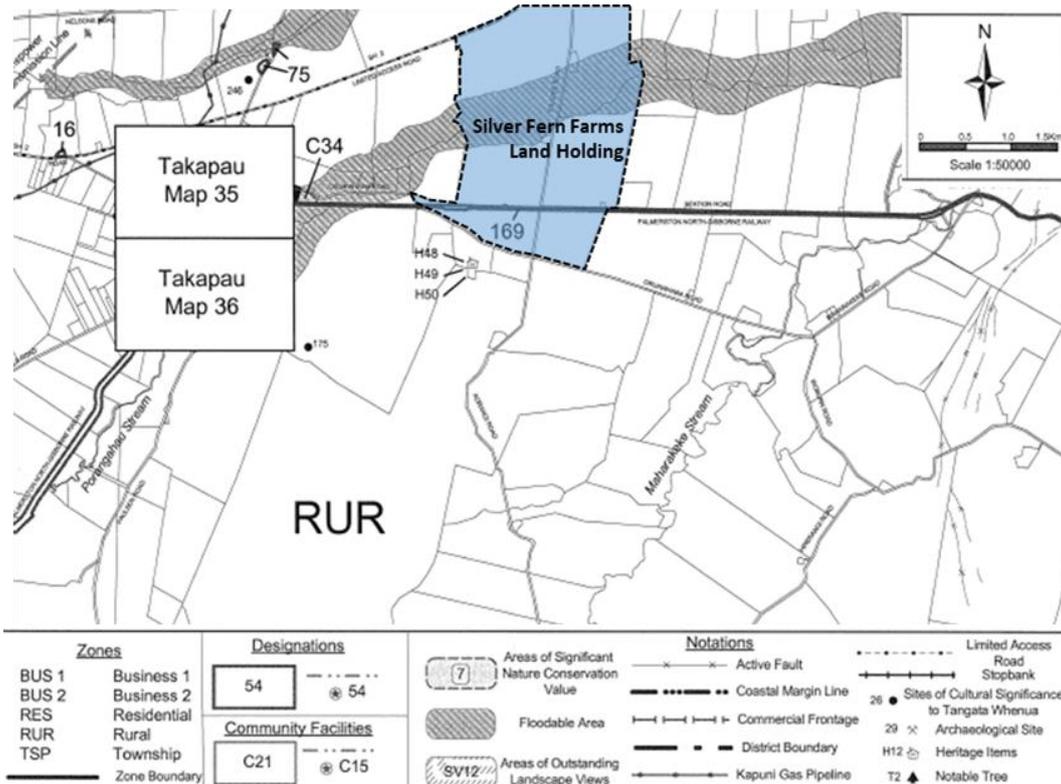


Figure 2.4(b): Zoning of Silver Fern Farms landholdings – Central Hawkes Bay District Plan.



3 THE EXISTING ENVIRONMENT

3.1 General Location and Context

Silver Fern Farms Takapau has been providing a service to farmers and employment to the local community since 1981, some 37 years.

The operating site is located in Central Hawkes Bay on the Ruataniwha Plains approximately 3 km east of the Takapau Township. The site is located on Fraser Road between State Highway Two to the north and Oruawhoro Road to the south. The Palmerston North Gisborne railway line crosses the site just south of the processing complex, as shown in Figure 3.1 below.

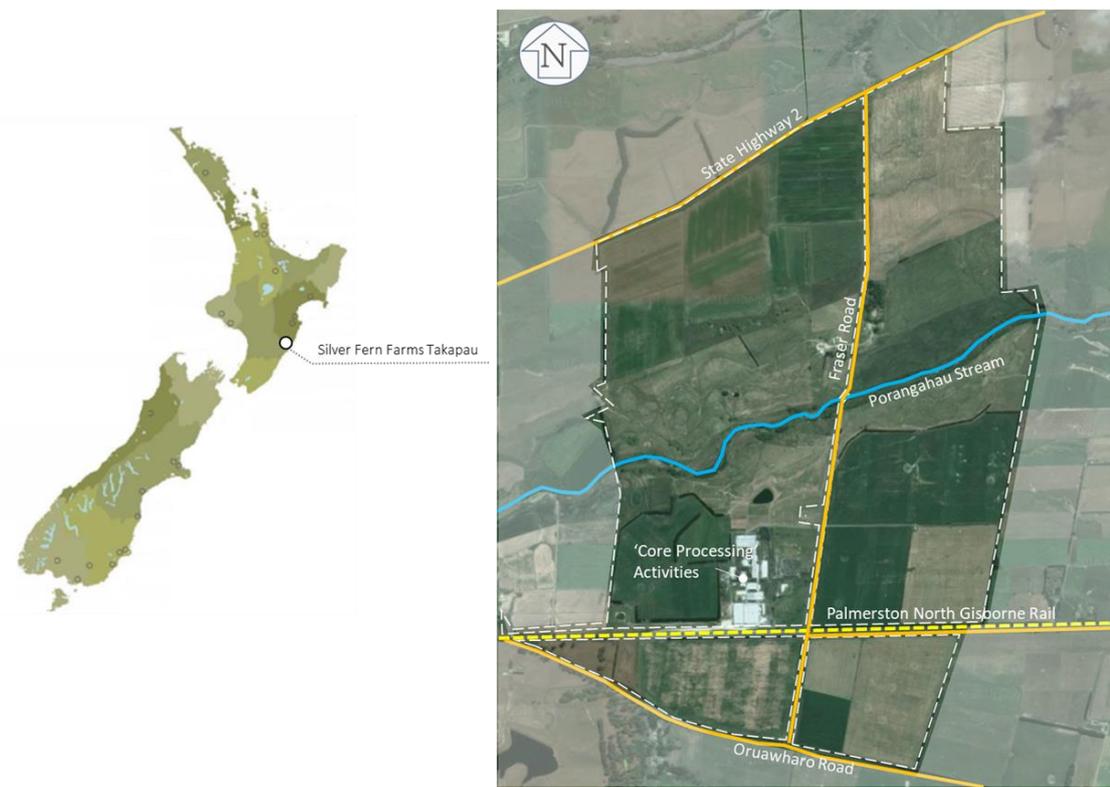


Figure 3.1: Indicative area of Silver Fern Farms Takapau operations.

The Operating Site encompasses:

- The core processing facility infrastructure – includes processing departments, boilers and wastewater treatment;
- Blocks A - E – includes wastewater irrigation using travelling irrigators fed off a reticulated mainline and stockyard solids application when required;

- Control Block – is used as a baseline comparison for wastewater activities as it does not receive any wastewater irrigation or stockyard solids;
- Block F and G – blocks are grazed and also receive stockyard solids as per permitted activity status. On occasions Block F is utilised by horse jumping for training or competition;
- Blocks S1 and S2 – are available for stockyard solids disposal and grazing;
- Domestic field – domestic wastewater irrigation via border dyke across a purpose built field; and
- Remaining land holdings – utilised for stock grazing, buffer zones, riparian plantings etc.

The immediate area surrounding the plant is characterised by flat to rolling pastoral land with the main land use being agricultural. Neighbouring farms provide a mix of dairy, pastoral and intensive cropping operations.

3.2 Existing Industrial Land Use Patterns

There are no other industrial activities in the immediate area, other than commercial farming activities. Hatuma Lime Co (fertiliser works) is located approximately 3.7 kilometres east of *the Operating Site*.

3.3 Existing Rural Use Patterns

The landscape setting of the receiving environment surrounding Silver Fern Farms landholdings is predominately rural. Characterised by abundant open space dominated by greenery, normal features associated with a working rural environment are in evidence on the land. These include fencing, shelterbelts, irrigation activities, and farm tracks. Buildings and other physical features, such as roads and transmission lines are also present in the surrounding landscape.

3.4 Existing Residential Use Patterns

The area surrounding *the Operating Site* is rural with only a few residential houses located within 500 metres of the sites property boundary, as shown in Figure 3.4 below.





Figure 3.4: Location of nearest dwellings within proximity to Silver Fern Farms Takapau boundary.

There are six properties located within this area:

- One property is located approximately 480 metres east from the property boundary of Block A and 500 metres from the nearest irrigation run.
- One property located 320 metres east of Block A was historically owned by the Company. Following the sale of this land in 2001, an encumbrance was placed over the property title. This was to address potential reverse sensitivity issues at the time. Given this, it could be argued that the consenting authority must not consider any potential for adverse effects on this property. However, the property owner was consulted in preparation for this AEE in line with the rest of the neighbours; see s. 10 for more details.
- The nearest residential house is located approximately 52 metres south of the Silver Fern Farms property boundary. However, this property is located within

proximity to the 'Control Block', which does not receive any wastewater or solids application. The nearest irrigation run is located more than 150 metres away.

- The Oruawhoro Homestead is located approximately 200 metres south of Block D. The 150-year-old homestead, has been developed into a function centre with operations expanding over the term of the expiring consents. The surrounding gardens and church facilities are used for a variety of events throughout the year. This includes, but is not limited, to weddings, high tea and opera events. The Homestead no longer operate a working farm as at the time of existing consents. In order to accommodate some reverse sensitivity matters, and as a good neighbour, Silver Fern Farms undertake a number of further mitigation measures to minimise the potential for odours during events at the Homestead.
- The dwelling north of State Highway Two is located approximately 180 metres from G Block which is permitted to receive stockyard solids however is largely used to graze short term stocking ratios. This property is located greater than 260 metres from the nearest wastewater irrigation run.
- Silver Fern Farms also owns a farmhouse on Arran Station, off Fraser Road, approximately 400 metres south of Block S2. Given that this property is owned by Silver Fern Farms, effects have been discounted.

3.5 Potentially Sensitive Receptors

Potentially sensitive receptors generally include, but are not limited to, hospitals, schools, day-care facilities, elderly housing and convalescent facilities. These are where the occupants are deemed more susceptible to the adverse effects of exposure to pollutants.

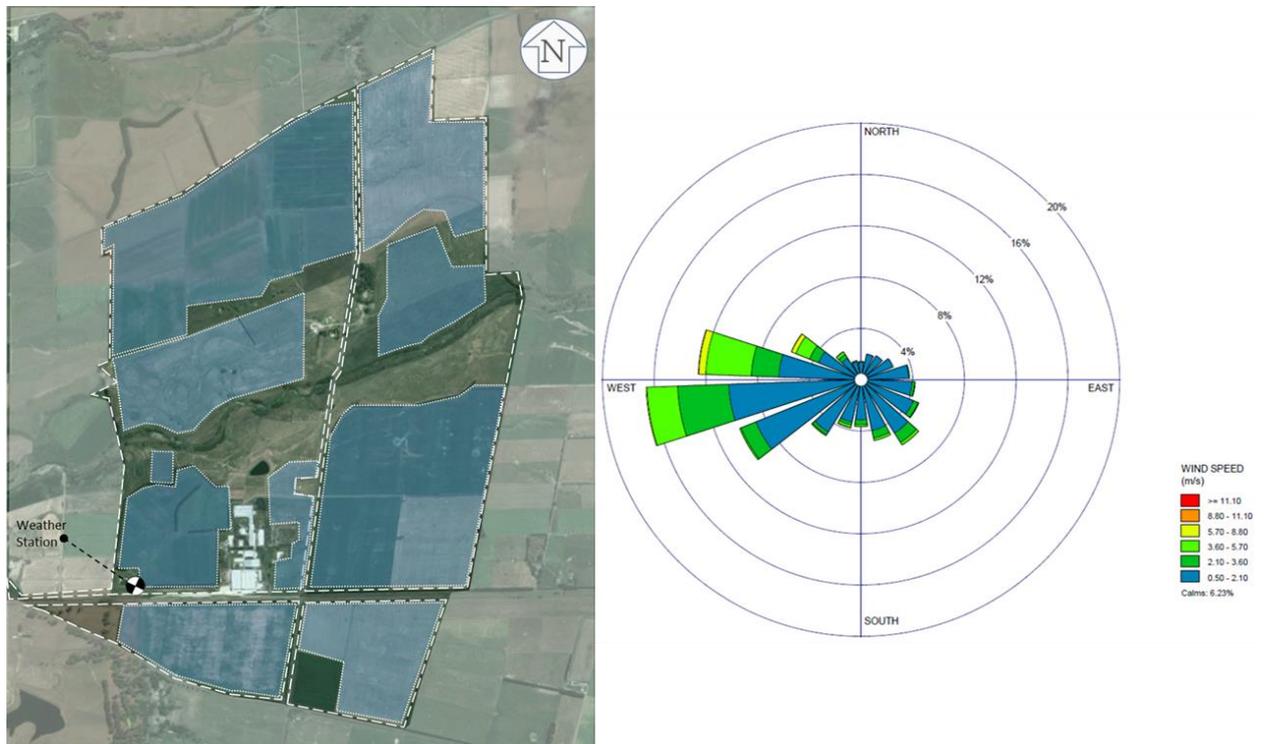
The general rule of thumb for determining the significance of potentially sensitive receptors are those within approximately 100 – 400 m of the footprint of the activity. Given this, there are no sensitive receptors located within close proximity to Silver Fern Farms Takapau.

3.6 Climatic Conditions and Air Quality

Meteorological data (including wind speed, direction, temperature and rainfall) is monitored daily and recorded by an on-site weather station, location shown in Figure 3.6 below. In addition, potential evapotranspiration (PET) is provided via the Central



Hawkes Bay District Council (CHBDC) weather station No.33 located near the Waipukurau airfield, approximately 12 km from the site.



Note: Nutrient application areas are shaded blue.

Figure 3.6: Wind speed / direction - Silver Fern Farms Takapau weather station (Oct 2010 – Sep 2017).

The climate in Central Hawkes Bay is temperate, but generally dry and warm. The mean annual temperature is 12.6 °C. Monthly maximum temperatures typical range between 24.1°C (January) to 11.2°C (July). Annual PET is relatively high at 1,304 mm. Rainfall is highly variable and the region often experiences droughts during the summer months. Average annual rainfall is approximately 774 mm.

As shown in Figure 3.6 above, the predominant wind direction is from the west towards rural farmland to the east. Wind speeds are generally low, with wind speeds less than 2.10 m/s approximately 79 % of the time. Calm conditions occur 6 % of the time.

The air quality in the Ruataniwha Plains is relatively good; the region has a low population density and few significant industrial emissions¹. The area surrounding the

¹ PDP (2010). *Discharge to Land – Resource Consent Application & S127 Change Assessment of Environmental Effects*. Pattle Delamore Partners Ltd. Auckland. March 2010

Silver Fern Farms Takapau Plant is predominantly utilised for agricultural activities, and as such there will be standard agricultural related air quality in the area.

3.7 Geology

The Takapau Plains are located on the southern edge of a depression trending northeast that underlies the larger Ruataniwha Plains. Basement rocks comprises of highly folded and faulted Triassic and Jurassic greywacke and argillites, overlain with Pleistocene sandstones, mudstones and limestones. Covering this is a mantle of mid/late Pleistocene fan gravels and sands².

The subsurface geology of the area is comprised of young gravel and silt known as the Ruataniwha Alluvium. The geology of the irrigation blocks (Blocks A – E) has been described as being located on aggradational river terraces covered in alluvium derived from fluviially redistributed tephra and loess over aggradational gravels.

There are a number of faults in the area, including the Oruawhoro Fault Zone which strikes from the south of Takapau in a northeasterly direction towards the intersection of Fraser Road and Oruawhoro Road. Another fault zone, the Takapau East Fault Zone, is located approximately 700 m east of the Oruawhoro Fault Zone.

3.8 Topography and Soils

Silver Fern Farms Takapau is located in rural surroundings principally characterised by flat land dissected through the central part of the property by a minor escarpment either side of the Porangahau stream.

The distribution of soils at the site are largely related to the underlying landform and can be classified into three broad groups, as shown in Figure 3.8 below:

- Allophanic and Pallic soils;
- Perch-gley soils; and
- Fluvial raw soils.

² PDP, (2018). *Technical assessment of environmental effects of discharging wastewater, stormwater and solid organic waste to land - Silver Fern Farms Takapau*. Pattle Delamore Partners Ltd. Auckland. June 2018



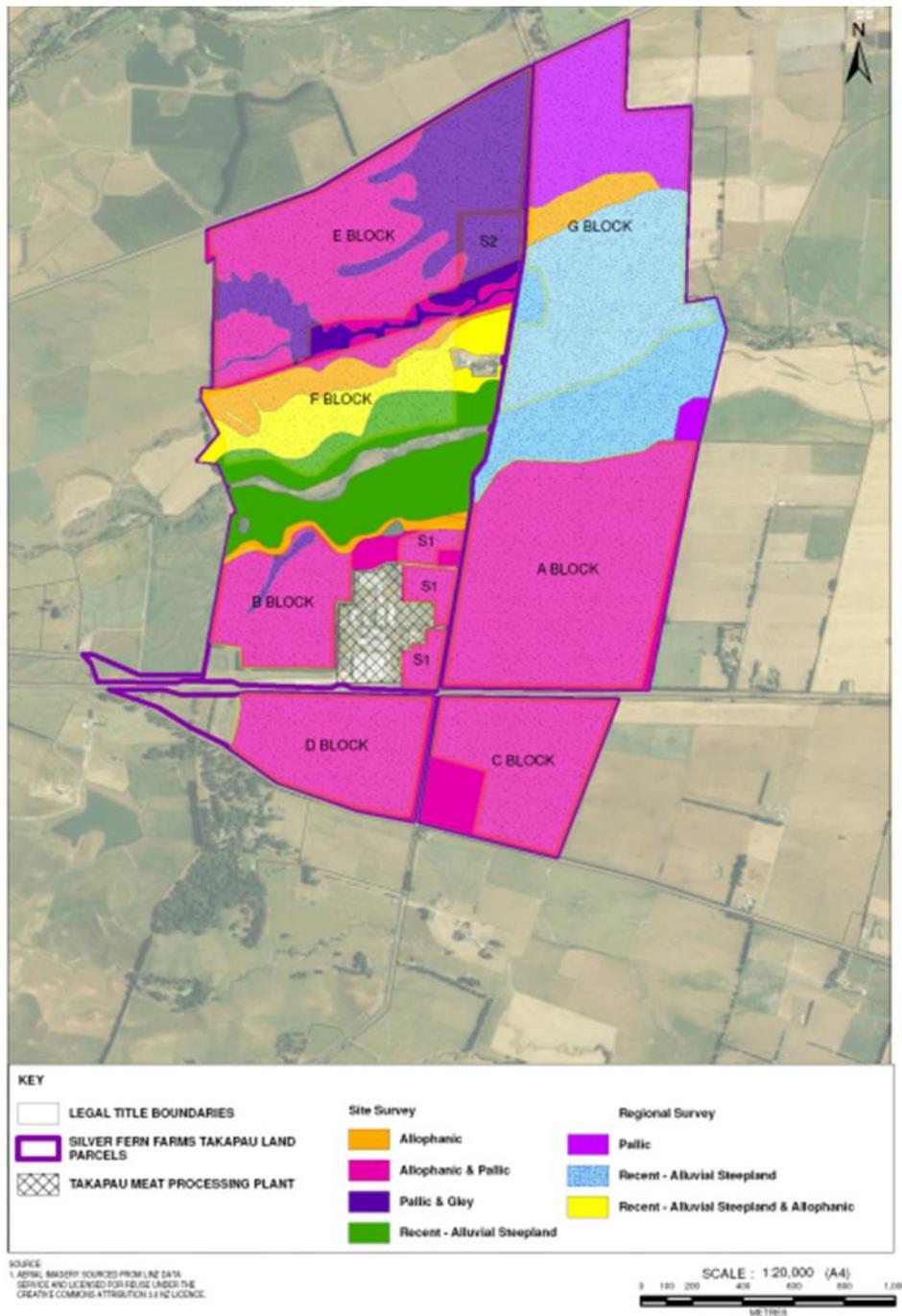


Figure 3.8: Soil properties (PDP, 2018).

3.8.1 Block A

Block A is located east of the processing plant and is bordered on the north, east and south by shelterbelt plantings. The block is bounded by the Palmerston North – Gisborne Railway Line to the south and Fraser Road to the west. The topography of the block is generally flat. Soils in this block are mainly composed of well-drained, rapidly-to-moderately permeable allophanic and pallic soils (Takapau and Tikokino).

3.8.2 Block B

Block B is located immediately west of the processing plant. The topography of the block comprises of flats and depressions. Soils are a mix of well-drained, rapidly-to-moderately permeable allophanic and pallic soils with a small section of poorly drained, slow permeable pallic and gley soils (Poporangi and Taniwha). Shelterbelts have been planted around this block.

3.8.3 Block C

Block C is located south of Block A and east of Block D. The Palmerston North – Gisborne Railway Line borders the block to the north, Fraser Road to the east and Oruawhara Road to the south. The topography of the block is generally flat with soils comprising of well-drained rapidly-to-moderately permeable allophanic and pallic soils. Sections of this block have been planted with shelterbelts.

3.8.4 Block D

Block D is located south of the processing plant bounded by Oruawhara Road to the south and the Palmerston North – Gisborne Railway Line to the north. Shelterbelts have been planted around this block. The contour of the land is generally flat and soils are well-draining to moderately permeable allophanic and pallic soils.

3.8.5 Block E

Block E is located the north of the processing plant. Shelterbelts have been planted along the boundary adjoining State Highway Two, Fraser Road and neighbouring landholdings to the west. The block is generally flat and is divided into two management areas, E Wet and E dry, according to soil type and whether the underlying landform is a depression or flat.

The dry areas are composed of the same soil types as Blocks A – D, and are well drained, rapidly-to-moderately permeable allophanic and pallic soils. The wet areas are composed of poorly drained, slow permeable pallic and gley soils containing pans, which cause the water table to be perched.

In 2010, Silver Fern Farms began developing a wetland area in a section of poorly draining shallow gully along the southern edge of Block E. The wetland was planted with native species chosen by the local Tangata whenua and was designed to



reintroduce wetland species to the area. At the same time, the wetland and plantings provide to prevent surface run-off from Block E from entering the Porangahau Stream via an ephemeral stream. The wetland increased amenity values, natural habitat and site relationships with local Tangta whenua as they assisted with planting out the area.

3.8.6 **Block F**

Block F is located immediately to the south of Block E and is bordered by the Porangahau Stream to the south. Parts of this block are located on lower terraces and floodplains. The topography of each terrace is mainly flat. The soils in Block F can be divided into three different soil types according to the underlying landforms. The lower terraces contain well drained allophanic and recent alluvial soils with moderate / rapid infiltration ability (Twyford and Takapau). The flood plains contain rapidly drained, gravelly alluvial soils which are considered to have very little water holding ability.

3.8.7 **Block G**

Block G is located east of Block E and is bordered by the Porangahau Stream to the south. Parts of this block are located on lower terraces and floodplains. The northern part of Block G contains similar soils to those of Block E with both wet and dry areas. The soils on the southern part of Block G are expected to contain soils similar to those found on Block F.

3.8.8 **Block S1**

Block S1 (Front Paddock North, Front Paddock South, Substation) are located on a terrace to the east of the processing site. These blocks are generally flat and have the same soil type as Blocks A, C, and D.

3.8.9 **Block S2**

Block S2 is located southeast of Block E. The topography of the block is flat and is predominantly composed of the same soils as E-wet in Block E.



3.8.10 Soil Analysis

In order to monitor potential effects on soils, soil nutrient levels are analysed annually across the wastewater irrigation blocks (Blocks A – E) and solids spreading blocks (Blocks S1, S2, F and G). Soils are also analysed in the Control Block for comparison, as this block does not receive any wastewater or stockyard solids.

3.9 Groundwater Resources

3.9.1 Aquifer System

The Ruataniwha Plains contains a number of confined and unconfined aquifers which provide approximately 70% of the water used for irrigation, industry, rural and domestic water supply in the area².

Three aquifers have been identified in the vicinity of the Silver Fern Farms Takapau Plant:

- **A shallow unconfined aquifer 5 – 15 m deep.** Supplies the spring fed streams in the area with substantial recharge from two rivers. Groundwater flow direction expected to be to the east-northeast, towards the Maharakeke Stream;
- **An intermediate (Main) semiconfined gravel aquifer 25 – 45 m deep.** This is the main water bearing aquifer under the site, and is thought to supply water to the Porangahau Stream via the Oruawharo Fault Zone. Groundwater flow direction is expected to be towards the east-northeast.
- **A deep aquifer 55 – 80 m deep.** It is believed that the deep aquifer supplies water to the Maharakeke Stream and the shallow aquifer east of the Oruawharo Fault Zone via the fault.

The Oruawharo Fault may have a significant impact on groundwater flows.

Earthquakes and associated ground movements could affect groundwater levels and flow directions in the aquifer system.

3.9.2 Registered Community Drinking Water Supplies

The nearest registered community drinking water source is the Takapau township supply bore (Bore 1762). This bore is located approximately 3 km upstream of Silver Fern Farms activities. The Waipukurau township supply bore is located approximately 12 km northeast of *the Operating site*.



3.9.3 Groundwater Quality

Following discussions with HBRC regarding the lack of groundwater quality information in the area, Silver Fern Farms installed a number of monitoring bores up and down gradient of the site, locations shown in Figure 3.9.3 below.

To monitor potential effects from land-based activities at *the Operating Site*, groundwater is analysed bimonthly across 20 monitoring bores for a number of different parameters.

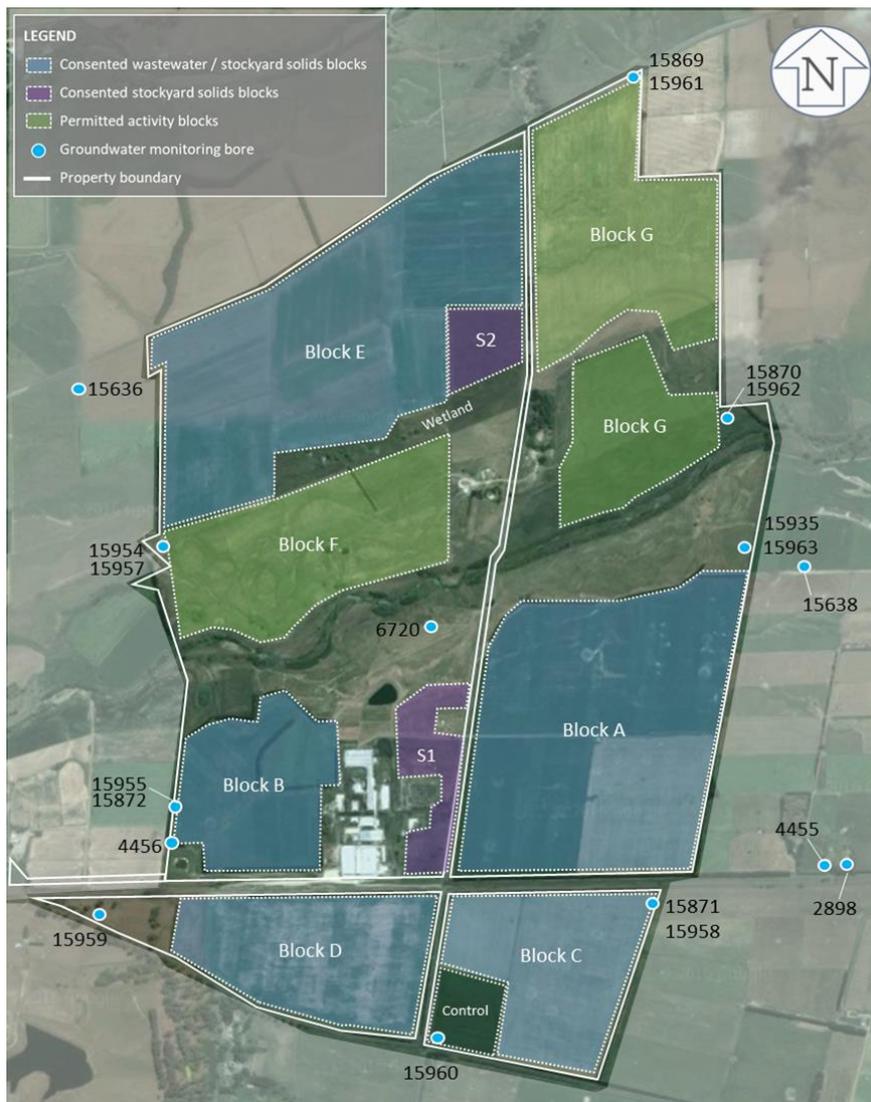


Figure 3.9.3: Indicative location of Porangahau Stream sampling points.

3.10 Surface Water

The Porangahau Stream flows through pastoral farmland before entering the property near the south-western corner of Block F. It flows approximately 2 km

through the site before exiting at the southeast corner of Block G, where it later joins the Maharakeke Stream, a tributary to the Tukituki River.

Flows within the Porangahau stream are highly variable and typically reduce during the summer months. The closest HBRC flow-gauging site is the Porangahau Stream at Oruawharo Road, located approximately 1.5 km upstream of the site. Base flows are approximately 50 L/s, with maximum high flow levels of up to 3,500 L/s².

Prolonged summer low flows tends to lead to the accrual of high periphyton biomass along the stream.

Water quality within the stream has been monitored consistently during the term of the existing consent, at locations shown in Figure 3.10 below.



Figure 3.10: Indicative location of Porangahau Stream sampling points.

Whilst under Maori occupancy, the Porangahau Stream and surrounding area were heavily planted. When farming began the land was cleared resulting in little or no

riparian vegetation to prevent surface runoff from occurring³. In 2008, Silver Fern Farms fenced off the riparian margins on the land area within the sites control. Areas within this margin have been planted with native species. However, it must be noted margins have not been fenced on neighbouring land.

There is an ephemeral stream which discharges seasonally into the Porangahau Stream. The ephemeral stream runs from west to east along the southern edge of Block E, and to the north of Block F. During the term of this consent, a farm drain was constructed to drain overland flow from neighbouring farmland along the western edge of Block E. This drain discharges towards the ephemeral stream.

3.11 Cultural and Historical Significance

The Takapau area and surroundings have a long history of Maori land use and occupancy. One of the earliest pā sites in the Takapau district was Te Horehore Pā, located approximately 1.5 km southwest of Block D. This pā was built in the early 1600's and is considered a wāhi tapu of important significance.³

Tangata whenua have a deeply intimate relationship with their natural environment. The connections between these people and their surroundings are seen and acknowledged in pepehā, proverbs or through names in the landscapes honouring ancestors of great mana or prestige.

The Porangahau Stream and surrounding waterways are of significance to hapū. These waterways once provided for an abundance of mahinga kai (food harvesting) vital for the sustenance and survival of hapū. Moreover, the village of Takapau is located at the edge of what is formerly known as 'the Seventy-mile bush'. The bush extended from the Manawatū gorge to Takapau and contained great strands of mataī, kahikatea, tōtara, rimu, maire timber as well as many other varieties of native plants. Little now remains of the original bush, other natural habitats and wetlands which historically covered most of the Takapau Plains.³

Tangata whenua from this area involve two marae, Te Rongo a Tahu and Rākautātahi. The hapū belonging to these marae are Ngāi Tahumakakanui, Ngāi Toroiwaho, Ngāi Te Kikiri o te Rangi, Ngāi Te Rangitōtohu and Ngāti Marau.

³ Heperi, J. (2018). *Cultural Impact Assessment Report In Relation to an Application for Resource Consents Renewal*, Puketōtara Consultancy.



3.12 Recreational Values

The land neighbouring the plant is of a rural environment and predominantly utilised for pastoral / grazing activities including dairy farms and intensive cropping operations. The residents of the area do derive amenity from the immediate area.

The contact recreational use of the Porangahau Stream within *the Operating Sites* property boundary is limited. Access to the stream is restricted from Fraser Road and is generally fenced off on all private land. It is therefore considered that the immediate landscape does not specifically provide for recreational activities or is an amenity destination in its own right.



4 DISCHARGE TO LAND – TREATED WASTEWATER AND STOCKYARD SOLIDS

4.1 Wastewater Treatment

Water plays an integral part in the processing of primary products into consumer items. A reliable, secure supply of good quality water is essential for the continuing viability of operations, as is the ability to appropriately dispose of wastewater.

Wastewater generated at *the Operating Site* is largely organic in nature and contains very little material that is not fully degradable by biological means; generally consisting of settleable and suspended solids derived from blood, paunch content liquids, stockyard washings and fat / protein from meat tissue. Wastewater is generated from food processing operations as such traces of cleaning chemicals will also be present.

There are a number of waste streams associated with the processing plant operations which undergo different treatments before being discharged:

- Wastewater is screened to remove gross solids and coarse particulates before further treatment through a Dissolved Air Flootation (DAF) unit, and then is irrigated to land;
- Wastewater from the stockyards, generally consisting of sheepyard 'pellets' carried within the wash water column, is dewatered by screening and solids are collected and spread onto company owned pasture using a tractor drawn muck spreader; and
- The solids recovered from mechanically screening the different processing wastewater streams are transported offsite to a third party for further processing (composting or rendering).

Figure 4.1 below shows a simplified schematic of the wastewater network.



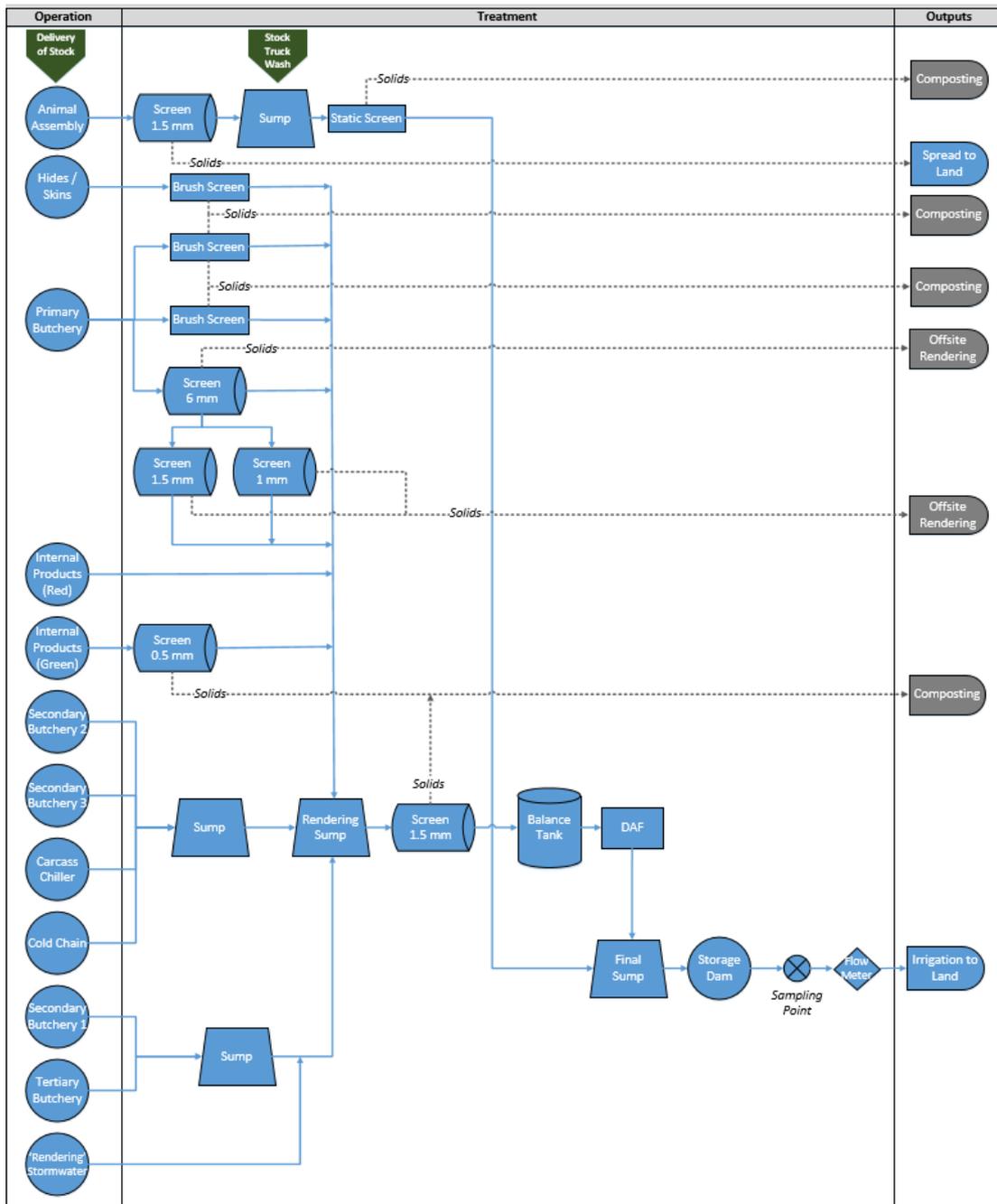


Figure 4.1: Simplified schematic of the wastewater network.

4.2 Existing Operations

4.2.1 Continual improvement

During the course of the existing consent⁴ (granted 1998) there have been a number of improvements made to the wastewater network and its management, summarised

⁴ DP981043Ld & DP981044Ad



in Table 4.2.1 below. A number of these improvements were in relation to the 2010 consent variation.

Table 4.2.1: Wastewater network improvements	
Year	Details
2008	<ul style="list-style-type: none"> Fenced and planted the riparian margins of the Porangahau Stream within Silver Fern Farms landholdings.
2009	<ul style="list-style-type: none"> Trial of new technology – installation of Travelling Irrigator Monitoring System. This system was used to monitor irrigator speed however encountered numerous issues which eventually lead to its failure and resultant removal. Livestock excluded from wastewater landholdings now exclusive cut-and-carry operation. Purchased Block A and G to bring Block A under Silver Fern Farms management and control, and to provide for extension of activities into Block G. Initiated a review of the land-based wastewater land-holdings following regional groundwater concerns raised by HBRC. Existing gravity lysimeters were found to be inaccurate and not functioning properly so replacement lysimeters were installed (positioned within the root zone approximately 300mm to the top of casing).
2010	<ul style="list-style-type: none"> Variation to land discharge consents applied for. Fence lines in Block E reconfigured to improve harvesting. Block numbers amended to reflect this. Further soil moisture monitoring equipment (Aquaflex) installed in Blocks A North, A South, Control, D, E3, E4 and E5. Amendments made to the way Silver Fern Farms record irrigation events. Historically the areas irrigated were recorded by block and not specific runs which did not reflect the actual area being irrigated. Individual runs established – irrigation events now based on run length and width within a block. Established a wetland in a section of poorly draining shallow gully along the southern edge of Block E. Additional riparian plantings complete.
2011	<ul style="list-style-type: none"> Additional gate valves installed on the wastewater mainline (Line 7) either side of the Porangahau Stream so that the line can be isolated in the event of an emergency. A new air bleeder was installed on the northern side of the Porangahau Stream close to the gate valves. Air bleeders were put onto a preventive maintenance program for routine cleaning to reduce the likelihood of water hammer within the wastewater mainline. Certificate of Compliance granted allowing stockyard solids to be applied to Block F and G as a permitted activity.
2012	<ul style="list-style-type: none"> Variation granted by Hawkes Bay Regional Council. Alterations made to the wastewater reticulation mainline. Lines 8 and 13 in Block E were connected to create a mini ring main and a booster pump was installed. These changes enabled a more even pressure in Block E than previously capable. Additional air bleeders installed along the wastewater reticulation mainline (Line 7). 14 additional groundwater monitoring bores installed up and down gradient of the land treatment areas. Silver Fern Farms now monitor 20 groundwater bores. 21 additional lysimeters installed (passive-capillary wick flux lysimeters) below the root zone approximately 600-750mm to the top of casing in Blocks A North, A South, Control, C2, D, B1, E1 and E6. Silver Fern Farms now monitor 41 lysimeters.
2013	<ul style="list-style-type: none"> Annual macroinvertebrate sampling of the Porangahau Stream commenced.
2013 - 2017	<ul style="list-style-type: none"> Modifications made to the travelling irrigators:



	<ul style="list-style-type: none"> - Flow meters were installed on all twelve irrigators. Irrigators were also lengthened and longer hoses and cables were added. - As a trial of technology, six irrigators were retrofitted with on board telemetry monitoring equipment including GPS tracking, on-board shutdown systems using flow restrictive controls and metering that records pressure, speed, volume and discharge rate.
2014	<ul style="list-style-type: none"> • DAF unit commissioned to assist with floatable solids removal from the wastewater streams. • Static screen installed to remove further solids from the stockyard liquid waste stream. • Closure of onsite rendering and blood-drying operations, significantly decreasing potentially odorous sources. • Upgrades to the pumping system within the main wastewater pump shed – second VSD and PLC installed. VSD installed to provide consistent pumping rates.
2015	<ul style="list-style-type: none"> • Weather station alert system developed – monitors wind direction and alerts when wind is blowing towards Oruawhoro Homestead. This allows irrigation to be stopped if necessary. • Technological improvements and modifications to the wastewater telemetry monitoring equipment proved problematic. Minor variation lodged to consent DP981043Lc to amend the relevant consent conditions, ensuring they meet the intent of the technological changes and also allowing for time for a decision to be made on the Ruataniwha Water Storage Scheme without entailing undue cost in the interim.
2016	<ul style="list-style-type: none"> • Variation to extend timeframe for the telemetry improvements granted. • Wastewater storage pond desludged. • Isolation valves installed in Blocks C and D to provide more control in a pipeline failure.
2017	<ul style="list-style-type: none"> • Upgraded the irrigation pumping systems to include variable speed drives and updated programming of booster pumps.

4.2.2 Application Areas

At present, *the Operating Site* is consented to discharge wastewater and stockyard solids onto several land blocks surrounding the processing plant, as shown in Figure 4.2.2 and detailed in Table 4.2.2 below. In addition, stockyard solids are applied to Blocks F and G as a permitted activity with a Certificate of Compliance (CC120130L).

The overall landholdings for *the Operating Site* is 482 ha. Of that 214 ha is utilised for wastewater and stockyard solids disposal. The balance of landholdings is made up of buffer zones, dryland blocks, riparian margins, a control block and a wetland.





Figure 4.2.2: Indicative location of wastewater irrigation and stockyard solids disposal blocks.

Table 4.2.2: Blocks utilised for wastewater and stockyard solids application			
Block	Area (Ha)	Activity	Land Use
A	70.88	Consented	Utilised primarily for wastewater irrigation currently by travelling irrigators however also has provisions to apply solids organic waste material (principally stockyard solids).
B	22.23		
C	30.56		
D	25.92		
E	69.12		
S1	8.5	Consented	Utilised for stockyard solids application.
S2	5.0		
F	39.4	Permitted	
G	77.4		

4.2.1 Wastewater Irrigation

4.2.1.1 Description of Activity

Silver Fern Farms utilise land-based treatment of wastewater across a number of its sites, where the wastewater from processing activities is irrigated onto pasture. The general premise is that the nutrient rich wastewater acts as a fertiliser and soil improver. When managed correctly, soil helps to 'treat' the wastewater in a sustainable manner while also providing a valuable source of nutrients to crops. The crops, primarily of high nitrogen demand, take up the nutrients provided. These are harvested and removed (along with the nitrogen they have taken up) from the site as frequently as possible (cut-and-carry).

4.2.1.2 Storage Pond

Wastewater generated at the plant is screened and pumped directly to a small bentonite lined holding pond located near the southern corner of Block B. The pond holds approximately one days processing wastewater and is primarily used as a buffer for irrigation pumping.

The pond is generally operated at a low volume, however some capacity is provided should a processing failure occur onsite. The existing consent⁴ requires the pond to be emptied to below 500m³ each operating day, unless soil moisture conditions are not conducive to irrigate. Given this, retention time is generally short but largely dependent on the volume of wastewater being received. More often than not retention could be less than three or four hours on production days.

Given the nature of the wastewater, localised odours may be emitted from the wastewater storage pond. However, these are not regarded as significant in terms of contributing to potential off-site impacts and are not detectable beyond the property boundary.

In order to monitor the ponds volume, a digital probe installed within the pond relays information back to the onsite SCADA system. Notwithstanding, a water level pole is installed in the pond with depth markings that allow for manual readings to assess the current pond volume and available storage.



Sludge that has settled on the bottom of the storage pond requires removal on an infrequent basis. When required, sludge is removed and placed on the side of the pond to dewater. This activity has the potential to generate odours. Material is then left in situ until the pond requires desludging again (about every two years since DAF commissioned) before it is used as infill or to level paddocks around the farm.

4.2.1.3 Irrigation Reticulation Network

Wastewater from the storage pond is pumped through an underground mainline before it is discharged to land using travelling irrigators, location of mainline shown in Figure 4.2.1.3(a) below.

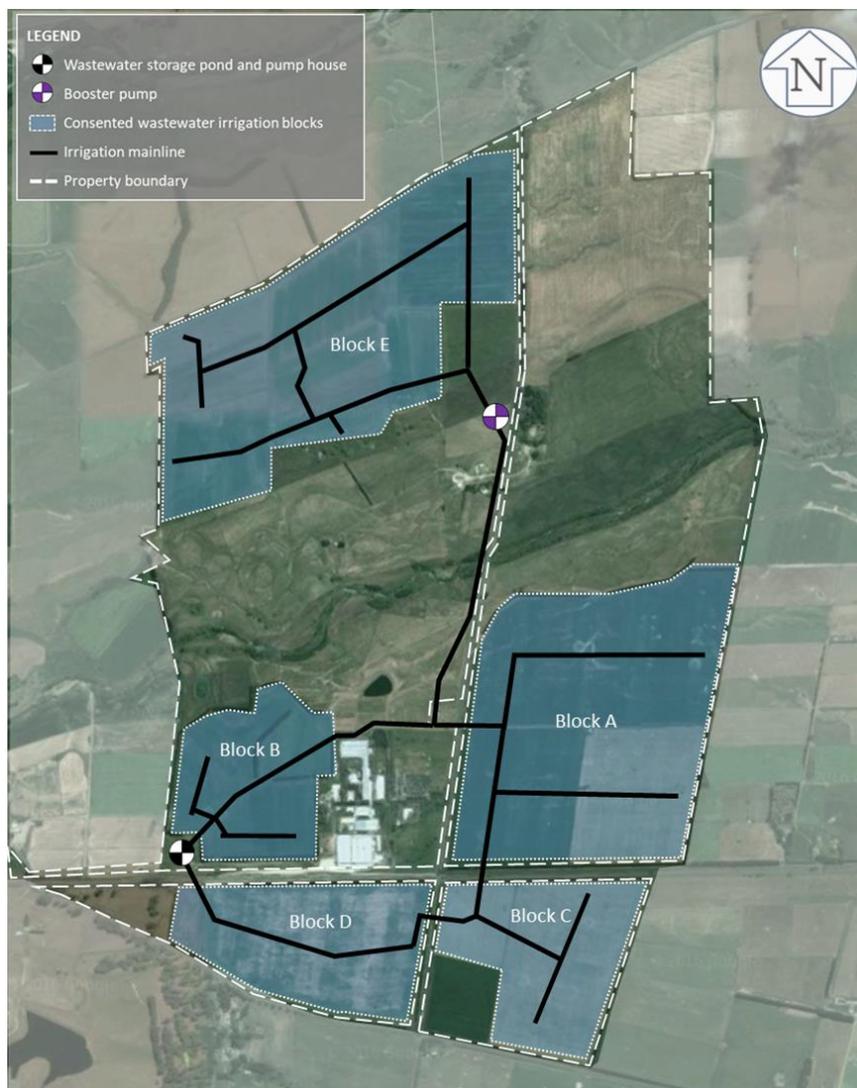


Figure 4.2.1.3(a): Indicative location of wastewater mainline.

The pipeline is made up of various pipe sizes, reflecting the different construction pipes, and consists of a ring main line with a number of dead-end legs that irrigate Blocks A, B, C and D. Another line transfer's wastewater to a mini ring main in Block E which also has a number of dead-ends. The latter line is controlled by a booster pump which provides for even pressure.

In order to decrease the probability of anaerobic conditions forming within the pipeline and the generation of odours, pipelines are routinely flushed with fresh water from the non-potable pond.

Silver Fern Farms have a company-wide policy to appropriately manage any incidents that may result in an unauthorised discharge to the environment, which includes informing the relevant authorities and co-ordinating corrective and remedial action where required.

As shown in Figure 4.2.1.3(b) below, over the last seven years there have been a number of pipeline breaks which have resulted in unauthorised discharges of wastewater. One of these events resulted in small quantities of wastewater entering the Porangahau Stream after flowing overland through riparian margins (2010). Another resulted from railway track repairs conducted by Kiwi Rail damaging a pipeline, all discharge contained on land (2014).

For each of the events, Silver Fern Farms responded immediately and made every effort to minimise the effects on the receiving environment. Notwithstanding, routine visual assessments are conducted on the surface above the pipelines to check for any signs of breaks, particularly following significant earthquakes within the region.



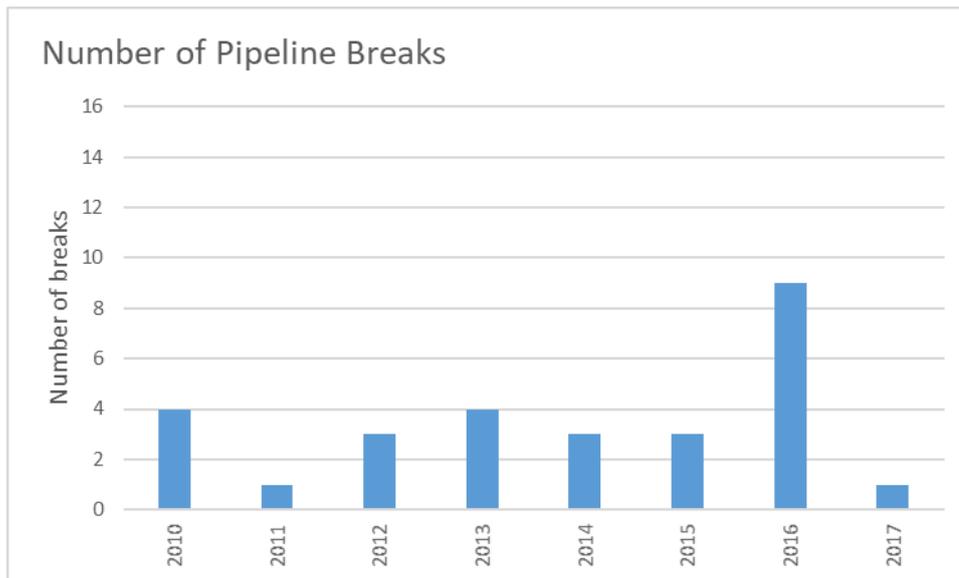


Figure 4.2.1.3(b): Number of pipeline breaks (2010 – 2017).

4.2.1.4 Irrigator Operation and Management

The irrigation system currently comprises of twelve traveling irrigators. Over the last five years, a number of technological enhancements have been made to the irrigation network. This has included installing flow meters onto each of the irrigators to allow for more accurate reporting of discharge volumes verses manufacturers specifications as previously reported. Moreover, six of these irrigators ('modified' irrigators) have been fitted with GPS locators, pressure control and telemetry as a trial of technology. This has not been straight forward as this is not 'off the shelf' equipment and not directly transferable to travelling irrigation.

Irrigation occurs year round onto runs within the irrigation blocks. As shown in Table 4.2.1.4 below, there are three application depths that determine the minimum irrigation return period. In the event where the maximum application depth is exceeded the site implements a self-imposed minimum return period of 21 days.

Application Depth (mm)	Minimum Return Period
< 30	7
31 - 45	10
45 - 65	14

Due to the large variation in irrigator application depths, return periods for runs within the same block can be variable. During the summer months when rainfall is low,

temperatures rise and evapotranspiration rates are high, crops can become stressed as the volume of wastewater applied is unable to maintain plants above wilting point. Moreover, the variation in return times within the same block can make it difficult to schedule harvest dates and at times areas of blocks are left longer than ideal for harvesting.

One of the main controls for the land-based disposal of wastewater is the management of nitrogen. At present, all of the wastewater blocks are managed as either cropped pastoral or cropped lucerne and are governed by a set nitrogen load, 650 kg/ha/yr for cropped lucerne and 600 kg/ha/yr for cropped pastoral.

In 2009, the Company enforced a zero-grazing rule onto all wastewater blocks, with the exception of pasture clean up between the rotation of crops or under emergency provisions i.e. fire risk. This was enforced in an effort to decrease the overall nitrogen loading to land without effecting processing operations.

In addition to the general nitrogen loading controls, hydraulic loadings also determine the management of land application of wastewater. E-Wet in Block E has specific hydraulic controls due to its poorly drained, slow permeable pallic and gley soils. As a result, irrigation is only undertaken on this block when the soil has sufficient moisture deficit, nominally during the summer months. Soil moisture on the other blocks is also routinely monitored using Aquaflex and hand-held soil moisture probes.

A site specific 'Integrated Land Management Plan' (ILMP) is provided as Appendix Three. This plan covers what is required to appropriately manage the relevant environmental aspects across the operation. The systems and procedures referenced ensure activities are undertaken in accordance with expectations. This ILMP has been prepared since the 2010 variation to ensure land management controls are captured in operating systems and procedures; this was not easily shown prior. Supporting reference documents for the ILMP are included in Appendix Four.

4.2.1.5 Discharge Volumes

The volume of wastewater generated at *the Operating Site* varies from season-to-season⁵. This is largely contingent on the condition of the farming season and stock

⁵ A season is from 1 October to 30 September each year.



availability. As shown in Figure 4.2.1.5(a) below, whilst there is variability across the seasons, volumes are relatively constant and within the consented limit of 1,365,000 m³ / year. However, given the nature of the industry, it is possible that stock throughput at the site could increase in the near future. In doing so, Silver Fern Farms will need to ensure that capacity is built into the consent to accommodate increased wastewater volumes.

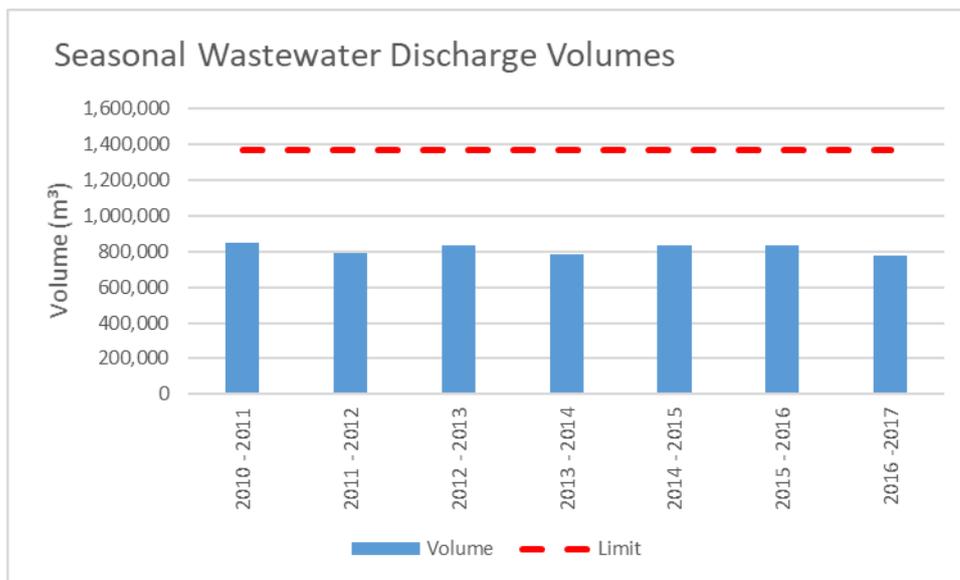


Figure 4.2.1.5(a): Seasonal wastewater discharge volumes (2010 – 2017).

Discharge volumes generally increase rapidly as the 'season' starts, rise to a peak reflecting supply of the different species then slowly diminishes until the end of the processing season, as shown in Figure 4.2.1.5(b) below.

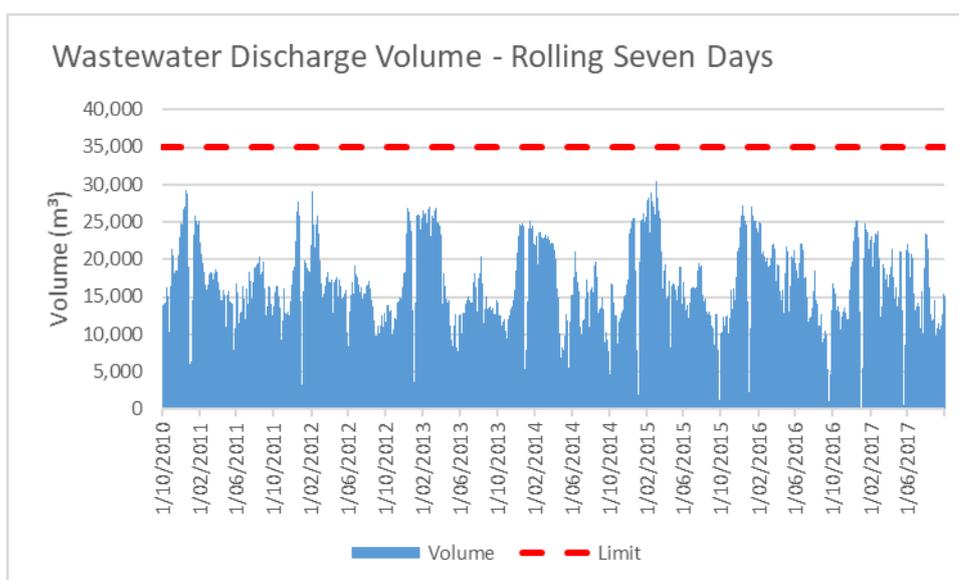


Figure 4.2.1.5(b): Wastewater discharge volumes over rolling seven days (Oct 2010 – Sep 2017).



Over the last seven seasons, discharge volumes were no more than 30,401 m³ over seven consecutive days, well within the consented limit of 35,000 m³.

Since there are no fundamental changes to wastewater irrigation activities and discharge volumes have remained within the current consent limits, Silver Fern Farms propose no change with the maximum discharge volume remaining at 1,365,000 m³ / year and 35,000 m³ over seven consecutive days.

4.2.1.6 Wastewater Quality

Routine in-line wastewater samples are collected and analysed for a number of parameters. Prior to July 2012, monthly wastewater samples were obtained by a 24-hour proportional sampler. Thereafter, Silver Fern Farms installed a flow proportional sampler to allow for a better representation of the wastewater irrigated to land, samples analysed fortnightly. A summary of the wastewater characteristics for the period 2010 – 2017 are provided in Table 4.2.1.6 below.

Table 4.2.1.6: Wastewater discharge quality (2010 – 2017)			
Parameter	Min	Max	Mean
pH	6.7	8.2	7.3
Chemical oxygen demand (g/m ³)	139	4,440	1,434
Total suspended solids (g/m ³)	126	1,950	498
Chloride (g/m ³)	0.06	148	83.6
Ammoniacal nitrogen (g/m ³)	6.9	1,420	41.3
Total Kjeldahl Nitrogen (g/m ³)	45	258	89.9
Total phosphorus (g/m ³)	7.0	36.5	14.2
Dissolved reactive phosphorus (g/m ³)	2.2	26.5	9.7
Total fat (g/m ³)	4	639	85.1
Potassium (g/m ³)	14.1	177	80.4
Calcium (g/m ³)	22.3	63.1	36.1
Magnesium (g/m ³)	5.7	13.3	8.2
Sodium (g/m ³)	50.6	149	91.2
E. coli (cfu/100ml)	54,000	230,000,000	20,690,574



The closure of the onsite rendering / blood drying operation and commissioning of the DAF plant resulted in some significant improvements to the quality of wastewater discharged post 2014. This is particularly evident in total fat concentrations, as shown in Figure 4.2.1.6(a) below. Anecdotal evidence pre closure suggests it was common to see ‘fat rings’ on the crops within the wastewater irrigation blocks. Nowadays instances of ‘fat rings’ are inconsequential.

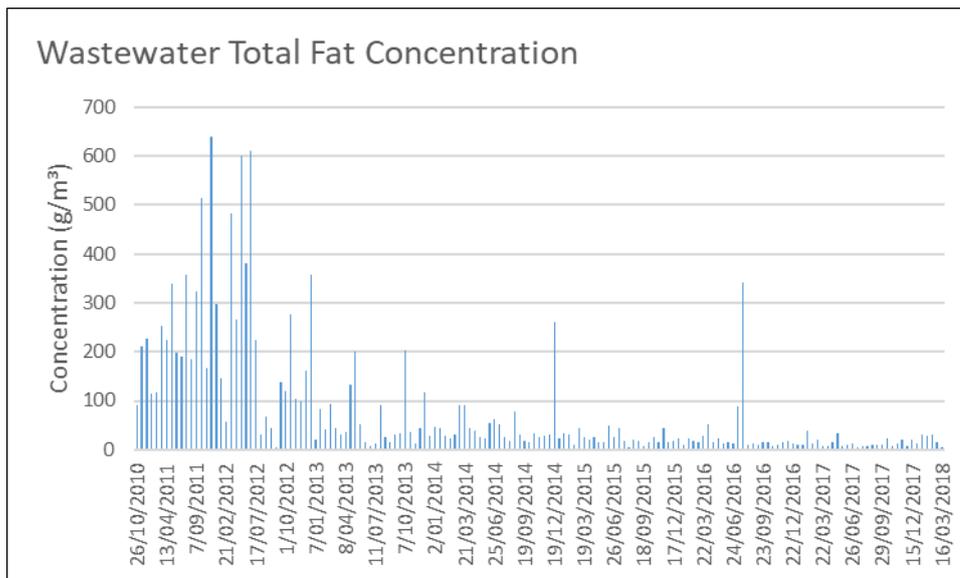


Figure 4.2.1.6(a): Total fat trend of wastewater discharged to land (Oct 2010 – Sep 2017).

The key contaminants of relevance to this renewal for the land-based treatment of wastewater are nutrients, namely nitrogen. Monitoring of this parameter is essential in calculating the nutrient loadings to land.

A feature of meat processing wastewater is that the majority of the nitrogen within the wastewater is ammoniacal nitrogen. This form of nitrogen, is both readily able to be lost to air through volatilisation following discharge onto land, and readily available for plant uptake. It does not accumulate in soil as it is readily oxidised to nitrate under conditions suitable for plant growth.

As can be seen in Figure 4.2.1.6(b) below, like total fat, the cessation of onsite rendering / blood drying operations and commissioning of the DAF has reduced Total Kjeldahl Nitrogen (TKN) concentrations. Additionally, there has been a gradual decrease in concentration in later years because of continuous improvements undertaken onsite.

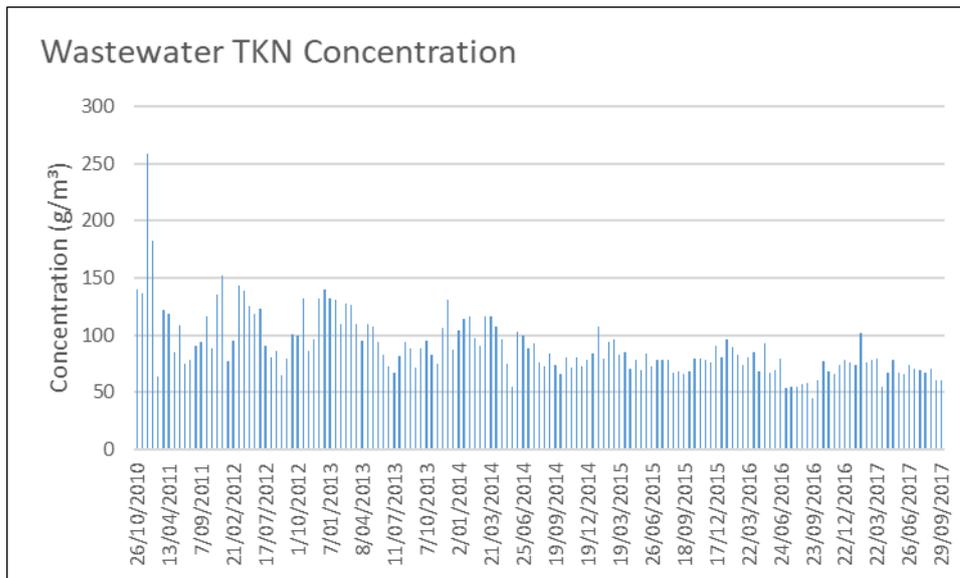


Figure 4.2.1.6(b): TKN trend of wastewater discharged to land (Oct 2010 – Sep 2017).

4.2.1.7 Nitrogen Load

Since processing began in 1981, the disposal of wastewater has always been to land, initially through border dyke irrigation before progressively converting to low pressure spray irrigation. It has been recognised that historical consented operations are likely to have contributed to elevated nitrate levels in groundwater down gradient of the plant.

This matter raised a significant concern for Silver Fern Farms regarding the perception and management of land-based treatment, highlighting the need to ensure that its land disposal operation is robust and appropriately managed.

As a result, during the term of the existing consent, Silver Fern Farms increased the land area available for disposal, added significant additional monitoring, closed the onsite rendering / blood drying operations, and continuously worked on improving wastewater management. In consequence, as shown in Figure 4.2.1.7 below, nitrogen loads across all the wastewater irrigation blocks have reduced. PDP concur with the above statement:

“Overall, the land management changes that have occurred at the site have reduced nitrogen loadings...” (p.p 62, s. 4.3, PDP Technical Assessment, June 2018).

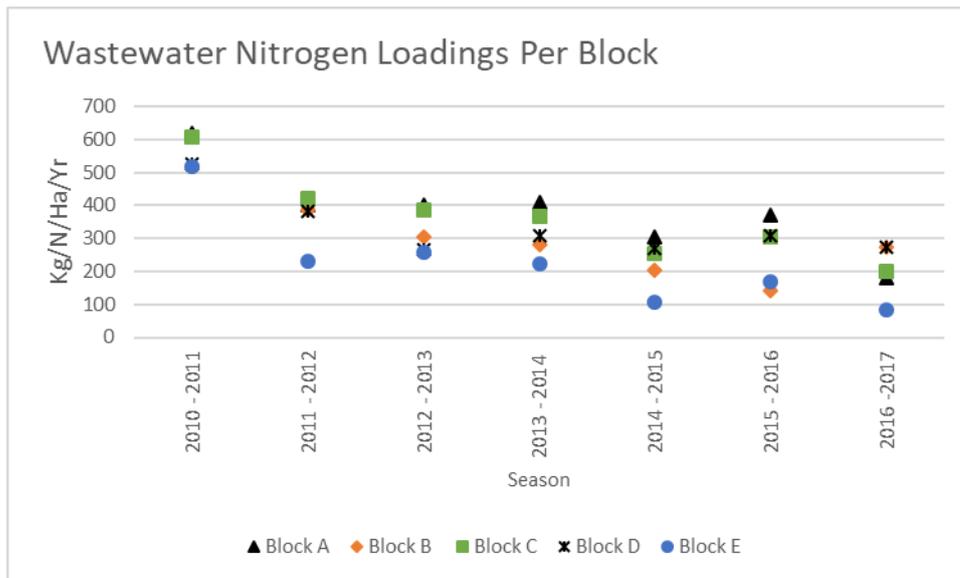


Figure 4.2.1.7: Wastewater nitrogen loadings per block (Oct 2010 – Sep 2017).

4.2.1.8 Nitrogen Removal

Applied nitrogen is managed through a cut-and-carry system. Nitrogen applied through the irrigation of wastewater is taken up by the plants and removed through the harvesting of crops and taken offsite for feed.

To date, *the Operating Site* have carried out a rudimentary mass balance in the absence of any reputable nutrient modelling package that accounts for a cut-and-carry operation. It is important to note that year-to-year seasonal harvesting variation may bias the annual rudimentary mass balance. That is, due to climatic conditions at the time of the last harvest for the season; may not occur until the next season. Conversely, some seasons mass balance may include two last harvests, the preceding season and current season.

Table 4.2.1.8 below summarises the simple mass balance for the last six seasons.

Season	Total N Applied (kg/N/Ha/Yr)	N Removed in Cut-and-Carry (kg/N/Ha/Yr)	N lost to Atmosphere (kg/N/Ha/Yr)	Denitrification (kg/N/Ha/Yr)	Irrigation Block N Loss to Water (kg/N/Ha/Yr)
2011 - 2012	354	289	42.5	6.50	15.99
2012 - 2013	306	229	36.7	30.58	32.77
2013 - 2014	307	268	36.8	3.82	- 2.43
2014 - 2015	237	349	28.5	-11.19	- 129.25
2015 - 2016	307	246	36.8	6.02	17.40
2016 - 2017	241	174	28.9	6.76	31.88

From the table it can be seen that the majority of nitrogen applied to the land holding is removed through the harvesting of the crops.

This is consistent with the OVERSEER modelling that was done as part of this consent renewal. PDP noted in their report that during the 2015 – 2016⁶ season:

“The nutrient load is almost entirely utilised by farming operations, with 119 kg/ha/yr of nitrogen and 15 kg/ha/yr of phosphorus exported as supplements” (p7 Technical Memorandum)

It must be noted, that whilst OVERSEER does factor in cut-and-carry, it is not entirely adequate to model the wastewater irrigation activities of meat processing operations with, modelling workarounds required to get a figure. This is not ideal but is currently the only available alternative.

4.2.1.9 Proposed Changes

After operating with the fixed return periods and application rates, soil moisture levels during the summer months have significantly reduced to a point where the soils are exhibiting hydrophobic tendencies, and plant growth is difficult to maintain. The plants are at times going past the wilting point.

To rectify, Silver Fern Farms Takapau propose changes to the consent conditions to provide for a two-tier wastewater application approach:

⁶ 1 October 2015 – 30 September 2016



1. Maintaining the current fixed return period of applying smaller volumes more frequently for most of the year where appropriate; and
2. Applying a variable return period, based on soil moisture level when this is below optimal for plant growth.

This will ensure that the available water supply matches the rate at which the crop uses water; to correct 'dry period' soil moisture levels, manage excessive evaporative losses, and to maximise the conditions for the removal of nutrients by the plants.

Silver Fern Farms also propose to incorporate Block E1A into Block E1 and Block E2A into Block E2. This does not fundamentally change the way irrigation activities are conducted as changes are only administrative.

4.2.2 Stockyard Solids

4.2.2.1 Description of Activity

Solids are generated while stock are held within the stockyards prior to processing. During routine cleaning, solids are transported within the wash water column, screened and augered into a tractor drawn muck spreader before being applied to company owned land.

4.2.2.2 Stockyard Solids Composition

The solids recovered from the contrashear generally consist of sheep manure in the form of 'pellets', with small amounts of wool or grit also present. Solids are routinely analysed, and typically comprise of between 11 – 20 % total solids and 1 – 3 g/100g TKN by weight.

The nitrogen content of the solids comprises of slowly digestible plant protein (organic nitrogen), which is non-mobile in soil. The mineralisation rate of the organic nitrogen into plant available nitrogen is very slow, which means that not all nitrogen is available as compared to wastewater based nitrogen. For stockyard solids, the general amount of plant available nitrogen in the first 12 months of disposal is normally one-third of the total amount of nitrogen measured at the time of disposal.



4.2.2.3 Application Method and Rate

The rate it takes to fill a spreader trailer is largely dependent on the species being processed, time held within the yards and whether stock were 'full' prior to transportation. In addition, onsite-cleaning requirements can also change the consistency of the material collected.

Each muck spreader trailer holds approximately 4 m³ of material. During peak season, up to two or three trailers of stockyards solids can be applied to land every day. The contour of the land determines the speed of the spreading activity and therefore the application rate to the land. Once applied, harrows are used to spread the solids allowing for a more uniform cover.

The application of solids to land is currently managed using an automated mapping and recording program. This program records the date, time and area solids are applied. Using this data together with the spreading width, volume and TKN concentration, nutrient loadings to land are calculated.

4.2.2.4 Land Management

The existing consent⁷ permits the application of stockyards solids to Blocks S1, S2 and wastewater irrigation Blocks A – E. Silver Fern Farms wishes to maintain the integration of both disposal activities on the available land treatment areas to maximise crop production whilst operating within the set nitrogen-loading rate based on crop type. If the total annual nitrogen load is less than the actual nitrogen requirements of the crop then Silver Fern Farms may consider supplementing the waste disposal activity with additional suitable fertiliser.

Following the purchase of Block G, Silver Fern Farms brought back in house the alternative stockyard solids spreading areas (previously some neighbouring farms were consented). In doing so, under permitted activity status, recognised by HBRC under a Certificate of Compliance, in 2011 Blocks F and G became the preferential areas for spreading. In consequence, Blocks S1 and S2 were retained as contingency areas, and have been rarely utilised for solids application in recent times.

⁷ Resource Consent DP981039Lb



In lieu of spreading solids onto Blocks S1 and S2, as agreed by the HBRC (2012), grazing was permitted to maintain pasture growth without the need to harvest. This also allowed the site to meet transport and scheduling requirements, as well as acting as a buffer in order to manage maintenance and mechanical breakdowns. Any nutrient input from stock on these blocks is calculated and included in the overall nitrogen budget.

4.2.2.5 Nitrogen Load

During the term of the existing consent, neither stockyard solids or fertiliser were applied to wastewater Blocks A – E, but this provision is required for contingency purposes.

Since the granting of the variation (in 2012), Blocks S1 and S2 have been managed as cropped pastoral with a set loading limit of 600 kg/ha/yr. As shown in Table 4.2.2.5(a) below, these blocks were rarely utilised for solids application, with nutrient input primarily coming from stock grazing. Nitrogen loadings on these blocks are well within consented limits.

Season	S1 - Front Paddock North (kg/ha/yr)		S1 - Front Paddock South (kg/ha/yr)		S1 - Substation (kg/ha/yr)		S2		Consent Limit
	Solids	Grazing	Solids	Grazing	Solids	Grazing	Solids	Grazing	
2012 - 2013	0	82	0	105	0	144	0	34	600 kg/ha/yr
2013 - 2014	0	56	0	21	0	124	48	0	
2014 - 2015	0	9	0	72	0	135	0	0	
2015 - 2016	0	26	0	41	0	87	24	0	
2016 - 2017	0	88	0	74	0	105	0	0	

Loadings to Blocks F and G are managed independently and comply with the permitted baseline levels for nitrogen load as stated in Rule 13 – Permitted Activity (Hawkes Bay Regional Resource Management Plan). This rule states that the application rate of solids to grazed pasture shall not exceed 150 kg/N/ha/yr. As shown in Table 4.2.2.5(b) below, nitrogen loadings on these blocks are within permitted limits.

Table 4.2.2.5(b): Nitrogen Loading Block F and G (2012 – 2017)											
Season	F1 (kg/ha/yr)		F2 (kg/ha/yr)		F3 (kg/ha/yr)		F4 (kg/ha/yr)		G3 (kg/ha/yr)		Permitted Limit
	Solids	Grazing									
*2012 - 2013	-	9	-	36	-	66	-	67	-	52	150kg/ha/yr
2013 - 2014	20	27	31	48	49	96	56	31	41	37	
2014 - 2015	30	56	61	32	47	48	11	30	16	39	
2015 - 2016	50	10	4	25	-	16	51	12	59	28	
2016 - 2017	-	43	45	37	4	50	2	53	26	31	
*No data available. Throughput was similar to preceding seasons and therefore volumes and loadings are likely to be consistent.											

4.2.2.6 Proposed Changes

As part of this consent renewal Silver Fern Farms Takapau are proposing to tidy up the aforementioned changes to handling stockyard solids. The proposed changes are:

1. Silver Fern Farms will not be renewing consent to apply stockyard solids to Block S1 given its proximity to the administrative buildings and main plant entrance. This block has not been utilised for solids disposal as there is sufficient land availability to receive solids in Blocks F and G and as contingency on Blocks A - E. Silver Fern Farms instead propose to utilise this block for the short-term grazing of stock ancillary to processing at low stocking ratios as a permitted activity.
2. Silver Fern Farms propose to incorporate Block S2 into Block E to be utilised for wastewater and stockyard solids disposal. Wastewater application to this block would be limited to a nitrogen-loading rate based on crop type and management similar to that currently conducted in E-Wet in Block E given similar soil properties.

These changes are not significant and will not materially change the scale or nature of the current activities.



4.3 Mitigation Measures and Monitoring

Wastewater application is managed appropriately to mitigate any potential effects.

Table 4.3 below summarises operations and associated mitigation measures in place.

Table 4.3: Mitigation measures and monitoring for wastewater and stockyard solids		
Operation	Avoidance, Remediation and Mitigation Measures	Aspect Managed
Buffer zones	<ul style="list-style-type: none"> • Buffer zones have been established between the irrigation areas and surrounding features, namely waterways, neighbouring properties and the property boundary. 	<ul style="list-style-type: none"> • Odour • Surface water
Shelter belt	<ul style="list-style-type: none"> • Shelter lines have been established along the roadside adjoining State Highway 2, some sections of Fraser Road, Station Road and Oruawharo Road. 	<ul style="list-style-type: none"> • Odour • Spray drift
Irrigation	<ul style="list-style-type: none"> • Traveling irrigators: <ul style="list-style-type: none"> - Operated at low pressure to reduce aerosoling. - Utilisation of large diameter nozzles on the travelling irrigators – produces larger droplets minimising the potential for the formation of finer droplets which can be readily dispersed by prevailing winds. - Pipelines are routinely flushed with freshwater so that solids do not accumulate within the lines, decreasing the probability of anaerobic conditions and therefore odour forming. - All irrigators have inflow meters to monitor the exact volume of wastewater applied to land. - Modifications have been made to six irrigators to allow for more robust monitoring, this includes the installation of GPS locators, pressure control and telemetry. - Utilisation of a DAF plant to remove fat and solids from within the wastewater stream. - Ability to move discharge to wastewater irrigation blocks when other activities are occurring. - Alarm when wind is blowing towards Oruawharo Homestead. This allows irrigation to be stopped if necessary • Wastewater reticulation mainline: <ul style="list-style-type: none"> - Regular monitoring of the pipeline infrastructure by 'walking the line' to visually check for any leaks. - Routine cleaning of the air bleeders to prevent water hammer along the mainline. 	<ul style="list-style-type: none"> • Odour • Spray drift • Ponding • Runoff
Weather station	<ul style="list-style-type: none"> • Wind speed and direction are monitored and irrigation is planned accordingly to reduce the likelihood of aerosols potentially affecting neighbouring properties. 	<ul style="list-style-type: none"> • Odour • Spray drift
Groundwater bore security	<ul style="list-style-type: none"> • Monitoring bores located on Silver Fern Farms landholdings are surrounded by a concrete pad and have secure wellhead protection. 	<ul style="list-style-type: none"> • Groundwater protection
Constructed wetland	<ul style="list-style-type: none"> • Silver Fern Farms Takapau have planted an area of poorly drained soils into wetland species to assist in preventing runoff from Block E entering the Porangahau Stream. 	<ul style="list-style-type: none"> • Surface water • Nutrient leaching • Runoff
Riparian plantings	<ul style="list-style-type: none"> • Silver Fern Farms have fenced off the riparian margins along the Porangahau Stream within its landholdings. Areas within this margin have been planted. 	<ul style="list-style-type: none"> • Surface water • Nutrient leaching • Runoff



Complaints	<ul style="list-style-type: none"> • If complaints are made directly to Silver Fern Farms Takapau, these are logged and the complaint is directed to those responsible for the potential cause of the issue, and to the sites Quality Environmental Auditor for oversight. • The HBRC are advised of any complaint, and any actions undertaken if required, including any follow-up with the complainant. • If complaints are made to the HBRC, the Compliance Officer generally informs Silver Fern Farms of the situation and seeks what actions are being undertaken if required to resolve. 	<ul style="list-style-type: none"> • Early response • Corrective action
Monitoring	<ul style="list-style-type: none"> • Silver Fern Farms Takapau carries out monitoring of activities and effects on a regular scheduled basis to ensure that activities remain within the on-site operational standards, and maintained within limits set by resource consents. Monitoring includes surface water, groundwater, lysimeters, soil moisture, wastewater quality, solids composition and soil analysis. • Results from monitoring are reported to the HBRC. 	<ul style="list-style-type: none"> • Early response of trends • Interpretive reporting
General	<ul style="list-style-type: none"> • Management Plans and Task Instructions ensures activities are carried out as required to mitigate the potential for effects to exceed the required onsite standard, before triggering any resource consent limit. 	<ul style="list-style-type: none"> • Standardised

4.4 Assessment of Environmental Effects

The potential effects from the continuation of applying wastewater and stockyard solids to land from Silver Fern Farms Takapau operations are considered to be:

- Potential effects on air quality;
- Potential social and economic effects;
- Potential effects on visual amenity;
- Potential effects on cultural values;
- Potential effects on soil quality and soil structure;
- Potential for nutrient leaching;
- Potential effects on groundwater quality:
 - Potential effects from nitrate nitrogen;
 - Potential effects from microorganisms;
- Potential effects on surface water quality:
 - Potential effects on water quality;
 - Potential effects on macroinvertebrate communities; and
- Potential effects on human health.

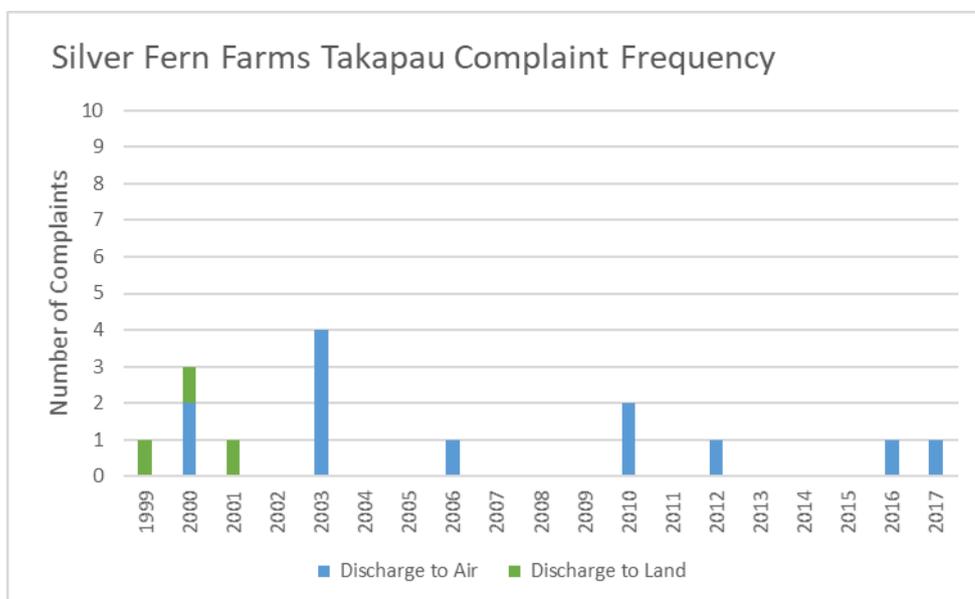


4.4.1 Potential Effects on Air Quality

As previously mentioned, the landscape setting of the receiving environment is rural with few residential properties located within 500 metres of *the Operating Site*. As such, dwellings in this area can reasonably expect to detect ‘smells’ associated with normal agricultural activities e.g. dairy farm effluent irrigation, feed lots, stockyards, and the running of a meat processing operation including the discharge of meat processing wastewater and stockyard solids.

The application of wastewater to land has the potential to generate aerosols and odours. This is largely influenced by weather conditions, operating parameters and people’s subjectivity and sensory perception. As such, the site maintains a complaint register.

Whilst the site has received some complaints regarding odours, as shown in Figure 4.4.1 below, these incidents are infrequent and have either been dealt with immediately, or unable to be substantiated upon investigation. Moreover, some of these complaints relate to the now redundant rendering / blood drying operations. Whilst not doubting the genuineness of any odour complaint, the majority of these appear to be of a short duration and able to be corrected once identified.



Note: total complaint numbers are from combined HBRC and site registers

Figure 4.4.1: Complaint frequency (1998 – 2017).

In order to alleviate the potential for spray drift and aerosols creating odours beyond the activity, *the Operating Site* manage these matters through (but not limited to):

- Operating the wastewater system at low pressure between 200 and 350 kPa;
- Utilising large diameter nozzles to maximise the size of the wastewater droplets, minimising the potential for finer droplets to form which can be more readily dispersed by prevailing winds;
- Maintaining appropriate buffer distances to ensure no issues beyond the boundary;
- Maintaining shelterbelts along areas of the property boundary. Not only are these plantings a mitigation measure, but they also have positive effects on providing for biodiversity around the site;
- Flushing pipelines with freshwater to reduce the potential for odour and wastewater going anaerobic in the pipeline prior to irrigation;
- Emptying the pond to below 500 m³ each operating day to reduce the potential for odour to be generated;
- Alarming the irrigation system to alert operators when the wind is blowing towards the Oruawhoro Homestead when using irrigators in Block D allowing them to be shut down if necessary; and
- Regular communication between *the Operating Site* and the owners of the Oruawhoro Homestead. This has been a long-standing agreement between the parties. Once the site is notified in advance of an event, providing sufficient notice is given, as a good faith gesture Silver Fern Farms is then able to interrupt its normal wastewater management operation provided this is not for extended periods or cause conflict with the processing operation.

While Silver Fern Farms Takapau have received some complaints about odours, these incidents are infrequent and have either been dealt with immediately, or unable to be substantiated upon investigation.

In assessing spray drift, aerosols, and odours PDP outlined that:

“The environmental effects on air quality are determined to be low, due to the region’s low population density, low number of complaints and the surrounding agricultural land use activities” (p.p 63, s. 4.5, PDP Technical Assessment, June 2018).

It is therefore considered that the effects on air quality by granting a replacement consent are no more than minor.



4.4.2 Potential Social and Economic Effects

Silver Fern Farms, and predecessors, invested significantly in physical resources such as land, buildings, and structures. The use, development and protection of those physical resources enable a large number of people to provide for their social and economic wellbeing.

Silver Fern Farms brand and processing operations rely on the productivity and success of our farmer partners to supply livestock. Our suppliers and local communities rely on our productivity, processing capability and flexibility, and success to add value to their livestock and provide the means to access those markets in order to maximise returns.

Fostering growth in the primary sector and providing for increased irrigation and productivity, will mean primary support industries, such as meat processing, will be required to ensure they can accommodate the increased productivity.

Meat processing traditionally has a seasonal 'peaks' in processing. Rationalisation of plants, changes in supplier agreements, procurement and scheduling have gone a long way to smoothing out the peak by spreading processing more evenly over the year however, with the majority of stock still being processed during November and March. Peak production equates to peak demand for water and therefore discharge of wastewater. The peak of the processing season coincides with warmer drier weather and peak demands from other water users.

During times of drought farmers often reduce stock numbers on farm by sending animals to be processed in order to avoid animal welfare issues. If water is restricted to our operations, in turn restricting processing capacity, the option to de-stock may not be available to farmers or stock may need to be transported further afield to premises without restrictions in place.

The diversion of stock to other plants either within or outside the region will result in a reduction in local expenditure, employment and incomes as a result of the direct and indirect (multiplier) effects of reduced processing capacity.

Given Silver Fern Farms operates a cut-and-carry activity where crop is generally sold standing and is distributed offsite, means that this supply of crop is further supporting the local community by providing ready access to a feedstock.



It is therefore considered that the granting of consents enabling the continued operation of *the Operating Site* will be less than minor. In fact, Silver Fern Farms believe its operations at Silver Fern Farms Takapau will maintain the economic wellbeing of people and communities within Central Hawkes Bay, the Hawkes Bay Region and further afield by:

- Maintaining significant direct and indirect employment opportunities for local residents;
- Maintaining significant direct and indirect wages and salaries for local residents; and
- Maintaining significant levels of direct and indirect expenditure with local businesses.

4.4.3 Potential Effects on Visual Amenity

The landscape setting of the receiving environment surrounding *the Operating Site* is rural and characteristic of a rural farm environment. Activities on these landholdings generally include the use of tractors, farm utility vehicles, irrigators etc. Buildings and other physical features, such as roads and shelter belts are also present in the surrounding landscape.

Silver Fern Farms, and predecessors, invested significantly in physical resources such as land, buildings, including purchasing neighbouring independent farms to develop the land-based wastewater irrigation network. As part of that development, shelter belts were planted to supplement existing plantings. This provides both a visual barrier to the wastewater irrigation activities, and also acts to minimise potential for spray drift and aid dispersion of any potential odours.

Moreover, wastewater irrigation activities and the disposal of stockyard solids to land are considered in character with the surrounding area and associated land use activities.

It is therefore considered that effects on visual amenity are no more than minor.

4.4.4 Potential Effects on Cultural Values

Silver Fern Farms recognise the inter-relationships between Maori and their tūrangawaewae, whenua or traditional lands. In preparation for this consent renewal,



Silver Fern Farms regularly consulted with Tangata whenua from Te Rongo a Tahu and Rākautātahi maraes.

In November 2017, Silver Fern Farms approached Tangata whenua to write a Cultural Impact Assessment (CIA) regarding the effects on Maori cultural values from the continuation of Silver Fern Farms Takapau activities, report provided in Appendix Five.

Findings of the CIA identified concerns regarding:

- The overall health and mauri of the Porangahau Stream; and
- The effects of wastewater irrigation on groundwater resources.

In recognising potential effects from the wastewater discharge to land, over the term of the existing consent Silver Fern Farms have implemented a robust management programme. This has included but is not limited to:

- Fencing and planted the riparian margins of the Porangahau Stream within Silver Fern Farms landholdings;
- Conducted routine monitoring of the Porangahau Stream to determine the effects from discharges to land on water quality, the health of the stream, and macroinvertebrate communities;
- Installation and monitoring of additional groundwater monitoring bores up and down gradient of the wastewater landholdings to better understand the sub-surface water quality;
- Acquired extra land to ensure that its disposal programme is sustainable and that nitrogen loading rates can be managed to meet the treatment capacity of the land;
- Maintaining appropriate buffer distances to the Porangahau Stream; and
- Trialling on board telemetry monitoring equipment on six of the travelling irrigators.

Tangata whenua have recognised these efforts made by Silver Fern Farms:

“The work that Silver Fern Farms has done to reduce its physical impacts on the whenua and the Porangahau awa; the riparian planting, the innovative technology used for monitoring and irrigation; the wastewater processes and the efforts for sustainability are to be commended”. (p.p 33, s. 6, CIA)



and,

“We have confidence that monitoring and reporting systems put in place will mitigate any negative impacts”. (p.p 33, s. 6, CIA)

Notwithstanding, Tangata whenua have highlighted continued support of the land-based wastewater irrigation operation developed by Silver Fern Farms Takapau:

“The Tangata whenua are supportive of the resource consent renewal application”. (p.p 33, s. 6, CIA)

It can therefore be considered that the effects on Tangata whenua is to be no more than minor.

4.4.5 Potential Effects on Soil Quality and Structure

The application of meat processing wastewater to land generally raises concerns in regards to the levels and ratios of nutrients and trace minerals in soils. Over a period of time, the application of wastewater can affect the optimal balance, or result in a higher than optimal level of components within the soils. In order to monitor the effects of wastewater and stockyard solids application on soils within the disposal blocks, soil nutrient levels are routinely analysed.

Similar concerns also arise where excess soil moisture could lead to ponding, runoff, contamination of groundwater, soil structure damage, reduced pasture growth, anaerobic soil conditions and odours. In order to mitigate these effects, irrigation is managed to reduce the potential for ponding and / or runoff.

The closure of the onsite rendering operation and continual operation of the DAF plant has assisted with removing fat within the waste stream, reducing the potential for ‘fat rings’ to form on the crops and or block soil pores. Instances of ‘fat rings’ on the crops within the wastewater irrigation blocks nowadays are inconsequential. This is supported in the HBRC 2017 – 2018 Compliance Monitoring Report, where the officer states:

“At the time of inspection there was no visible signs of deposition of any particulate material ...”



As shown in Figure 4.4.5(a) below, soil analysis has shown that average pH levels in the soil across the wastewater blocks are within optimum levels required for pasture growth⁸.

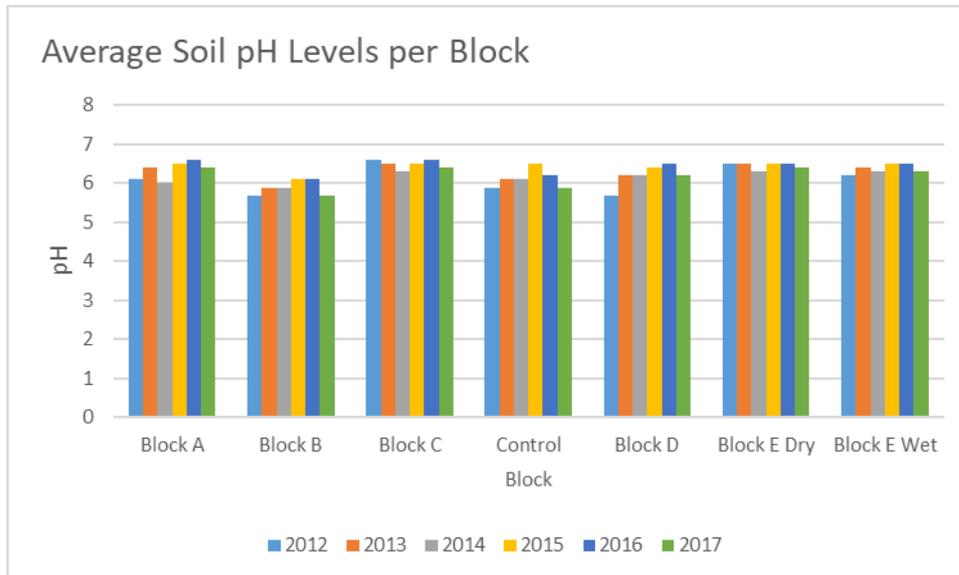


Figure 4.4.5(a): Average pH levels in soils (2012 – 2017).

Olsen-P is a measure of the phosphorus availability to plants. As shown in Figure 4.4.5(b) below, monitoring data shows elevated Olsen P levels in the main irrigation blocks (Blocks A, B, C and D).

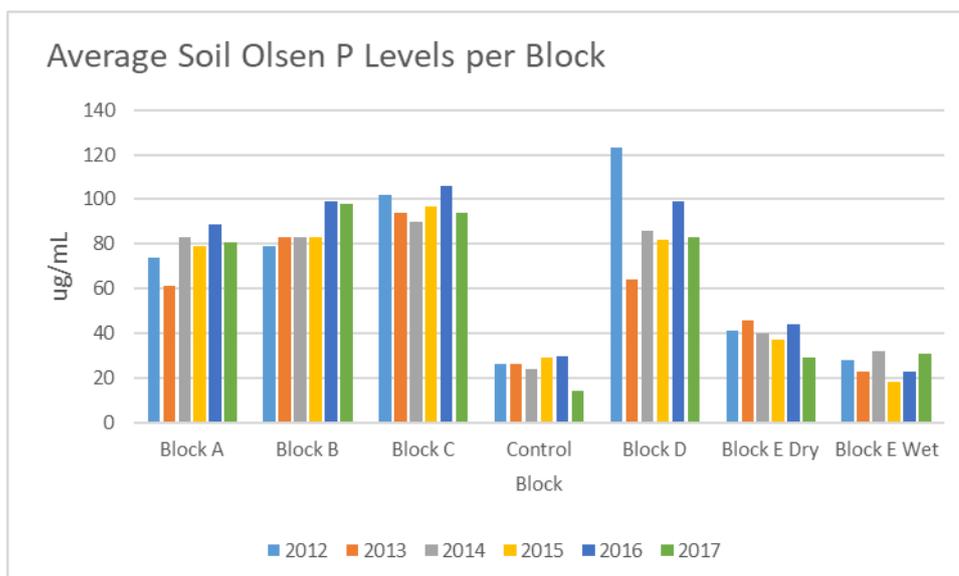


Figure 4.4.5(b): Average Olsen P levels in soils (2012 – 2017).

⁸ Dairy NZ. (2012). *Critical Nutrient Levels for Pasture (Farmfact No. 7-5)*. Dairy NZ

According to Dairy NZ, the optimum level of Olsen P for land use is 30 – 40 mg/L⁸. Nutrient modelling undertaken by PDP show that average phosphorus loading rates across all blocks are slightly in excess of crop uptake rates, which is primarily due to the organic nature of the wastewater being applied.

Even though Olsen P levels in the soil are elevated above optimum land use levels, monitoring of the Porangahau Stream does not indicate that excess phosphorus is entering surface water. The lack of stock grazing on wastewater irrigation areas and minimal loss of soil carrying phosphorus also minimises any potential loss.

Analysis has also shown that average sodium levels are elevated for all irrigation blocks when compared to samples taken from the Control Block, as shown in Figure 4.4.5(c) below.

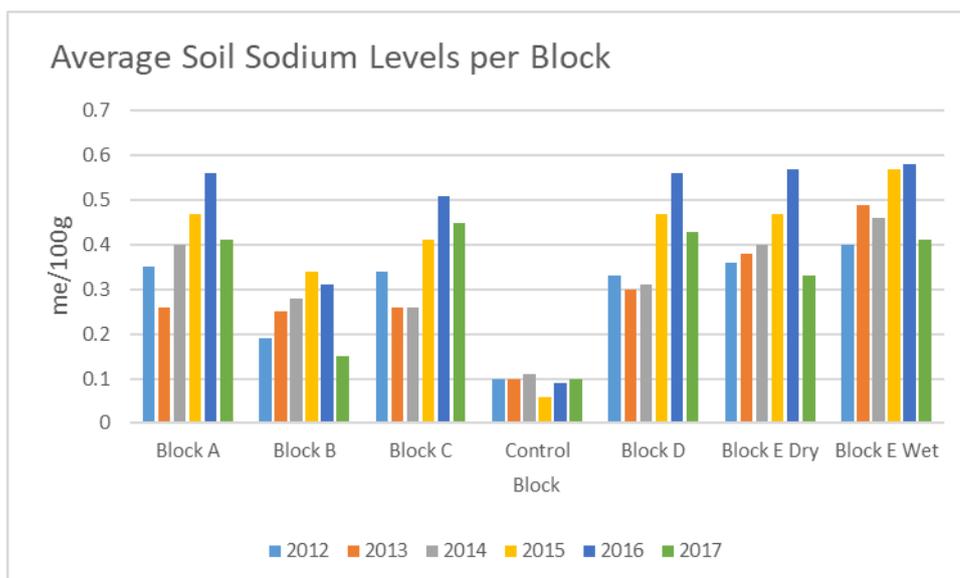


Figure 4.4.5(c): Average sodium levels in soils (2012 – 2017).

Whilst this is the case, monitored exchangeable sodium percentage levels are low and PDP state that:

“...it is not expected that the soils will be experiencing impaired permeability as a result of elevated sodium”. (p.p 4, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)

For the purpose of this consent renewal PDP carried out additional assessments. Visual soil assessments of the wastewater land treatment area were conducted to

assess the general condition of the soils. In addition, soil samples were also obtained and analysed for nutrients, heavy metals and permeability testing.

PDP in their assessment concluded:

- The existing irrigation areas, Blocks A – E, are more hydraulically constrained due to soil types than nutrient constrained.

“... soil condition appears to be more affected by soil type than wastewater application”. (p.p 59, s. 4.1, PDP Technical Assessment, June 2018)

- Silver Fern Farms are managing the application of wastewater onto E-Wet in Block E appropriately. This block is only irrigated when the soil has sufficient moisture deficit.

“Permeability testing of the gley soils and visual observation, confirms that wastewater irrigation of this soil type is unsuitable except for deficit irrigation during summer and early autumn”. (p.p 59, s. 4.1, PDP Technical Assessment, June 2018)

- Soils within irrigation Blocks A – D are well managed and suitable for the current irrigation regime.

“Soil permeability testing indicates that the allophanic / brown soils have good particle distribution and are suitable for the existing irrigation rate. (p.p 59, s. 4.1, PDP Technical Assessment, June 2018)

- Heavy metals concentrations within the soils are low.

“Monitoring of the irrigation blocks indicates that there is minimum increase in heavy metal concentrations in comparison to the background levels and all results are well below guideline limits”. (p.p 4, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)

- The land-based treatment of wastewater is not creating any adverse effects.



“...the process wastewater irrigation does not appear to be having an effect on the soil condition within the irrigation blocks” (p.p 59, s. 4.1, PDP Technical Assessment, June 2018)

Effects on soil quality and structure are therefore considered to be no more than minor.

4.4.6 Potential for Nutrient Leaching

In order to identify the level of nutrient leaching that could be expected from *the Operating Sites* entire landholdings (including all land-disposal areas and non-irrigable areas), PDP modelled discharges using the OVERSEER nutrient modelling programme based on the 2015 – 2016 processing season.⁶

Modelling outputs (Table 6, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum Technical Memorandum) show that wastewater irrigation (process and domestic) and stockyard solids spreading contribute 120 kg/ha/yr of nitrogen and 19 kg/ha/yr of phosphorus which is generally well utilised by the cut-and-carry operation:

“The nutrient load is almost entirely utilised by farming operations, with 119 kg/ha/yr of nitrogen and 15 kg/ha/yr of phosphorus exported as supplements”. (p.p 7, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)

There is some modelled nutrient loss via leaching within the soil column (17 kg/ha/yr), and to the atmosphere via denitrification and volatilisation (11 kg/ha/yr). PDP consider the rates of nitrogen loss across the land disposal areas as being:

“... low for this type of wastewater management system...” (p.p 61, s. 4.3, PDP Technical Assessment, June 2018).

and;

“...reasonable when compared to the predominantly sheep and beef farming land use in the wider area”. (p.p 7, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)



However, when modelling output is compared to the lysimeter monitoring data, lysimeters show much higher concentrations of nitrogen in the soil water than would be expected from the land management operation (Table 7, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum Technical Memorandum). It is unclear why there is such a disparity with the data as elevations are generally not apparent in groundwater monitoring. There is also the potential for preferential flow and PDP noted that there was a:

“...failure rate for samples due to insufficient volume ... (approximately 65%)... ” (p.p 31, s. 3.6.4, PDP Technical Assessment, June 2018)

PDP suggested that:

“...in light of the lysimeter results and in line with good management practice, it is recommended that some consideration is given to further optimising management to minimise nitrogen leaching.” (p.p 8, PDP Technical Assessment, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)

Modelling also shows that phosphorous may be accumulating in the soil, due to the flat nature of the land, however it suggests that there is minimal loss to water. Therefore, it is considered that the potential effects to be no more than minor.

4.4.7 Potential Effects on Groundwater Quality

The main constituents of wastewater that have the potential to effect groundwater quality are nitrates (through leaching losses from crops and soils) and microbial pathogens.

As groundwater monitoring has been conducted throughout the duration of the existing consent term, and with the installation of additional monitoring bores, there is adequate historical data to assess long-term trends in groundwater quality.

Trends and potential effects on groundwater from Silver Fern Farms land-based disposal activities were reviewed by PDP in 2010 and again for this consent renewal.



Note: Bore 15960 is classified as an up gradient bore in Resource Consent DP981043Ld & DP981044Ad as it is located in the Control Block up gradient of Block C. Whilst this is the case, it is also located down gradient of Block D. Given this, it has been referred to as a down-gradient bore in this application.

4.4.7.1 Potential Effects from Nitrate Nitrogen

Silver Fern Farms have identified bores 4456, 2898, 15638, 15963, 15871, 15958 and 15960 as key in assessing potential effects from nitrate nitrogen, locations shown in Figure 4.4.7.1(a) below.

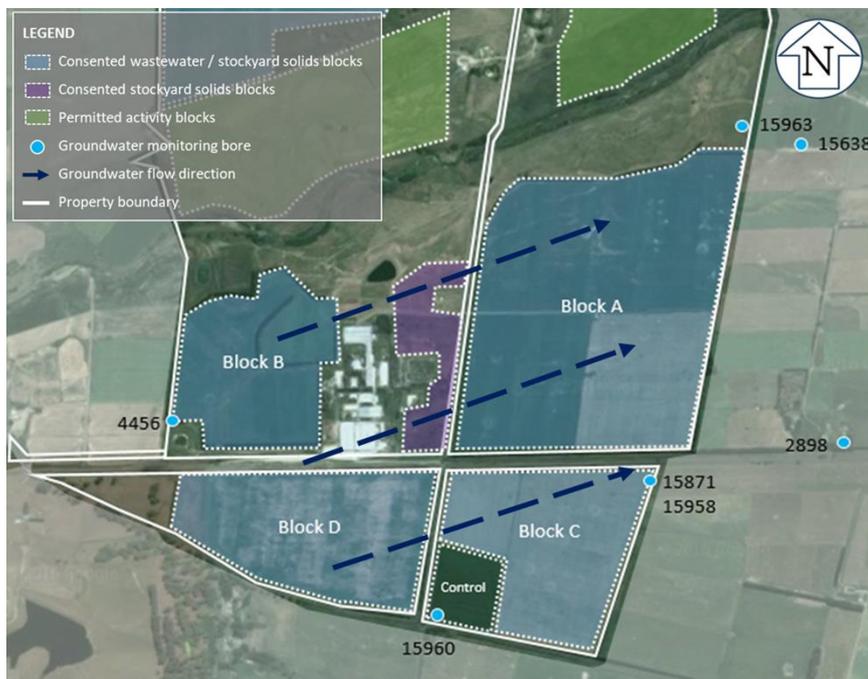


Figure 4.4.7.1(a): Groundwater monitoring bore locations.

Figure 4.4.7.1(b) below shows the nitrate nitrogen concentration in bores 2898, 15871, 15958 and 15960, located down gradient of Silver Fern Farms activities.

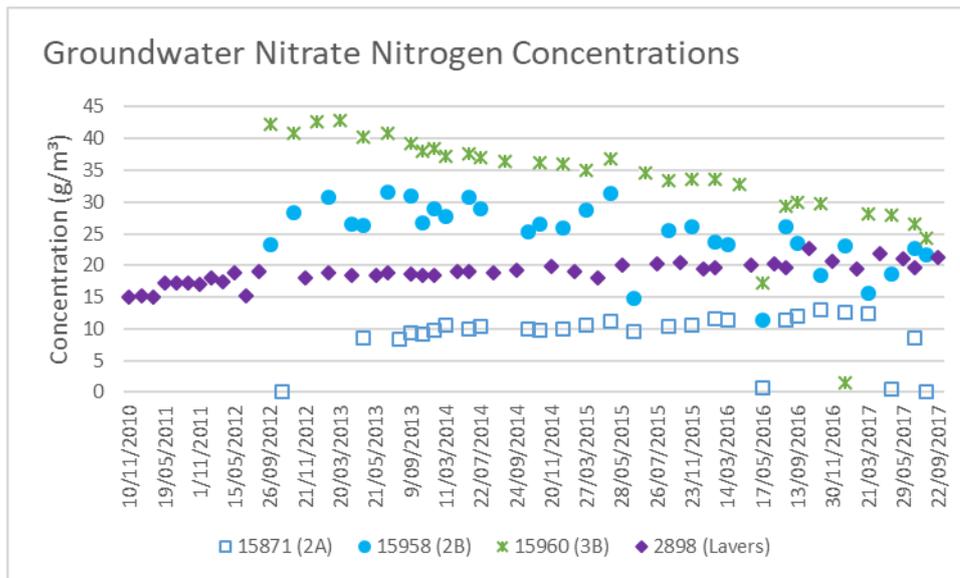


Figure 4.4.7.1(b): Nitrate nitrogen concentration in bores 15960, 15958, 2898 and 15871 (Oct 2010 – Sep 2017).

Elevated nitrate nitrogen concentrations within these bores has been attributed to high nitrogen loadings via consented border dyke irrigation in the 1980's - 1990's. As groundwater flows generally in an eastward direction, these bores are located in the path of any potentially contaminated groundwater. Modelling undertaken by PDP (2010) theorised lag times of up to 43 years for the plume to fully pass. It is considered during this time, nitrate concentrations in these bores will decrease and stabilise.

In line with PDP predictions, nitrate nitrogen concentrations within shallow groundwater bores 15960 and 15958 are trending down. However the levels in these two bores still remain well above the Maximum Acceptable Value (MAV) in Drinking Water Standards for New Zealand 2005 (revised 2008) (DWSNZ). Monitoring of these two bore is proposed to continue to ensure that further declining trends are observed.

Whilst concentrations within intermediate bores 2898 and 15871 are exceeding the DWSNZ of 11.3 g/m³, they do show lower concentrations than the shallower bores and appear to be stabilising. Monitoring of these two bores is also proposed to continue in order to observe the expected decline or stabilisation in nitrate levels.

Bore 2898 is the only one of these bores used to supply drinking water. The bore is the primary private residential drinking water supply for the dwelling on the property. Silver Fern Farms provide the property with a nitrate filter. Filters are included on the

sites preventative maintenance programme and are replaced frequently. Water quality samples obtained in May 2018 show that the filter is reducing concentrations from 21.5 g/m³ to 0.57 g/m³, well within the DWSNZ of 11.3 g/m³. Silver Fern Farms propose to continue provisions to supply nitrate filters to this property.

As some of the monitoring bores are located outside of Silver Fern Farms landholdings or border neighbouring intensive farming operations, there is potential that these land use activities could also be influencing water quality results.

Figure 4.4.7.1(c) below shows the nitrate nitrogen results for bore 4456, 15638 and 15963, located within the shallow aquifer. With the exception of Bore 15963, monitoring indicates that nitrate concentrations are increasing within these bores however, levels currently remain within the DWSNZ of 11.3 g/m³.

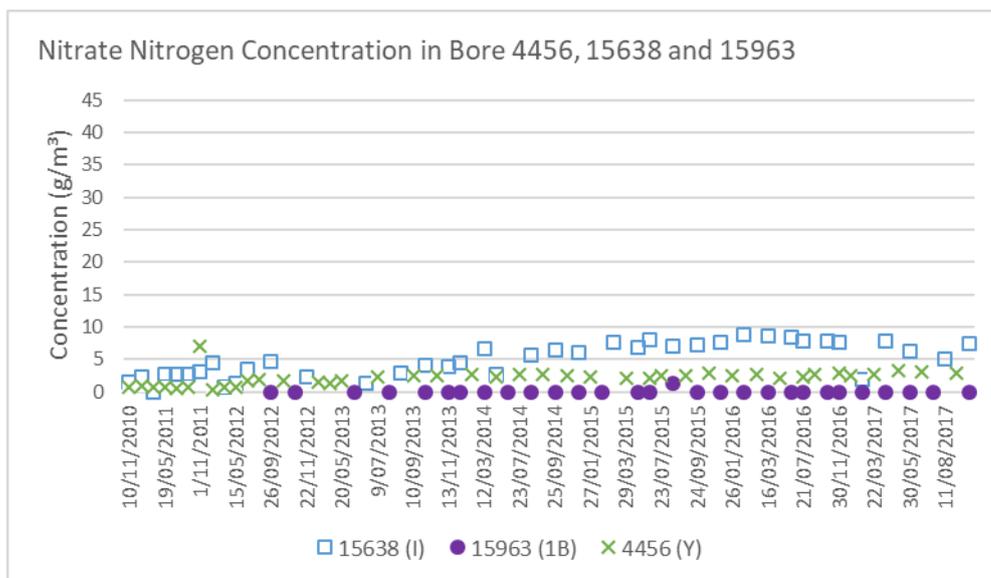


Figure 4.4.7.1(c): Nitrate nitrogen concentration in bores 15638 and 4455 (Oct 2010 – Sep 2017).

Bore 15638 is the only down-gradient bore that has had an increasing trend. This bore is located northeast of Block A on neighbouring farmland that is used to grow various crops, primarily potatoes. PDP have suggested that:

“This land use may be contributing to the change in water quality, which means it is difficult to isolate any effects due to Silver Fern Farms activities”.
(p.p 43, s. 3.8.4, PDP Technical Assessment, June 2018).

This is supported in monitoring data for Bore 15963 which shows stable concentrations of nitrate nitrogen (Figure 4.4.7.1(c)). This bore is located immediately down gradient of Block A within Silver Fern Farms landholdings but up gradient of Bore 15638. Therefore, the influence must be from other land use activities.

Notwithstanding, Bore 4456 is located immediately south of Block B, where the historic border dyke activity occurred, and borders a neighbouring feedlot. It is possible that this bore may experience some effects from both activities.

Nutrient modelling conducted by PDP indicates that improvements made during the term of the existing consent have resulted in low rates of nitrogen loss across the land disposal blocks and that:

“... groundwater concentrations should trend downwards over time with on-going good management” (p.p 62, s. 4.3, PDP Technical Assessment, June 2018).

Furthermore, monitoring has shown that there is a noticeable absence of elevated nitrate concentrations resulting from pipeline breaks, with little variation in groundwater quality between up and down-gradient monitoring bores evident.

Given this, PDP concludes that effects on groundwater:

“...are minimal from the plant”. (p.p 61, s. 4.3, PDP Technical Assessment, June 2018)

and;

“Aside from the historic impacts from past activities at the site that are still observable in groundwater, overall, the effects of the current discharges are being well managed with limited observable impacts in the extensive monitoring data that has been collected”. (p.p 64, s.5, PDP Technical Assessment, June 2018)

It is therefore considered that with the improvements in management and through the additional groundwater monitoring implemented over the term of the consent, effects on groundwater to be no more than minor.



4.4.7.2 Potential Effects from Microorganisms

Given the nature of the wastewater generated at Silver Fern Farms, the microbial loadings within the wastewater can be high. This is monitored using the indicator organism *E.coli* which is analysed in the wastewater and through groundwater monitoring.

The basis of monitoring *E.coli* is that the growth and survival in open environments is often restricted by exposure to sun / desiccation / competing soil microbes etc., meaning that transportation into groundwater only generally occurs where there are direct conduits or excess contamination sources.

As shown in Appendix Six, *E.coli* counts in the groundwater are generally low and comparable up and down gradient of the land disposal blocks. Therefore, the wastewater discharges appear to not be having an effect on groundwater quality. This is supported by PDP's findings that:

“Microbial impacts from the activities are not discernible from background concentrations”. (p.p 61, s. 4.3, PDP Technical Assessment, June 2018)

Given there is no adverse microbial impact from the activity, and the large separation distances between the Takapau and Waipukurau supply bores, Silver Fern Farms land-based wastewater discharges are unlikely to impact community drinking water supplies. This was also the conclusion of PDP in their assessment:

“No effect on the community drinking water supply identified in Section 2.2 is expected...” (p.p 62, s. 4.3, PDP Technical Assessment, June 2018)

It is therefore considered that microbial effects on groundwater to be less than minor.

4.4.8 Potential Effects on Surface Water

4.4.8.1 Potential Effects on Water Quality

As previously mentioned, water quality in the Porangahau Stream upstream and downstream of Silver Fern Farms land-based treatment areas has been monitored continuously over the term of the existing consent. As shown in Table 4.4.8.1 below, water quality at the upstream and downstream monitoring sites is comparable but



indicates the stream is typical of an intensively developed pastoral catchment, suggesting as a whole, it is mildly to moderately enriched⁹.

Parameter	Upstream - 397			Downstream - 2431		
	Min	Max	Mean	Min	Max	Mean
pH	7.4	8.6	7.9	7.2	8.7	7.8
Temperature (°C)	7.4	24.1	13.7	7.3	23.4	14.3
Dissolved oxygen (gO ₂ /m ³)	5.4	15.6	10.2	3.8	31	10.6
Chloride (g/m ³)	11.9	25.4	17	11.8	26.6	17.1
Nitrate nitrogen (g/m ³)	0.01	5.81	1.5	0.01	5.69	1.5
Ammoniacal nitrogen (g/m ³)	0.01	0.1	0.01	0.01	0.1	0.01
DRP (g/m ³)	0.005	0.095	0.027	0.005	0.12	0.023
<i>E.coli</i> (cfu/100ml)	13	7,900	262.9	3	6,600	208.2
TKN (g/m ³)	0.8	8.6	1.2	0.8	4.6	1.1

Whilst DRP concentrations at the upstream and downstream monitoring locations are generally low, maximum levels are above the Hawkes Bay Regional Resource Management Plan surface water quality guidelines of 0.015 g/m³ for the avoidance of undesirable algal growth. As phosphorus levels in the Porangahau Stream are above the levels that would trigger nutrient enrichment for periphyton growth, any additional phosphorus from the land disposal activity is not likely to contribute to additional periphyton yield beyond what is currently being experienced.

Nitrate nitrogen concentrations fluctuate seasonally, with higher values being recorded at times when higher agricultural runoff from streams is expected (Figure 4.4.8.1(a)). Whilst this is the case, results indicate that there is little difference in concentrations between the upstream and downstream locations.

⁹ Triplefin. (2018). *Macroinvertebrate Monitoring at Sites in the Porangahau Stream Adjacent to Silver Fern Farms Takapau: 2018 Survey*. Napier



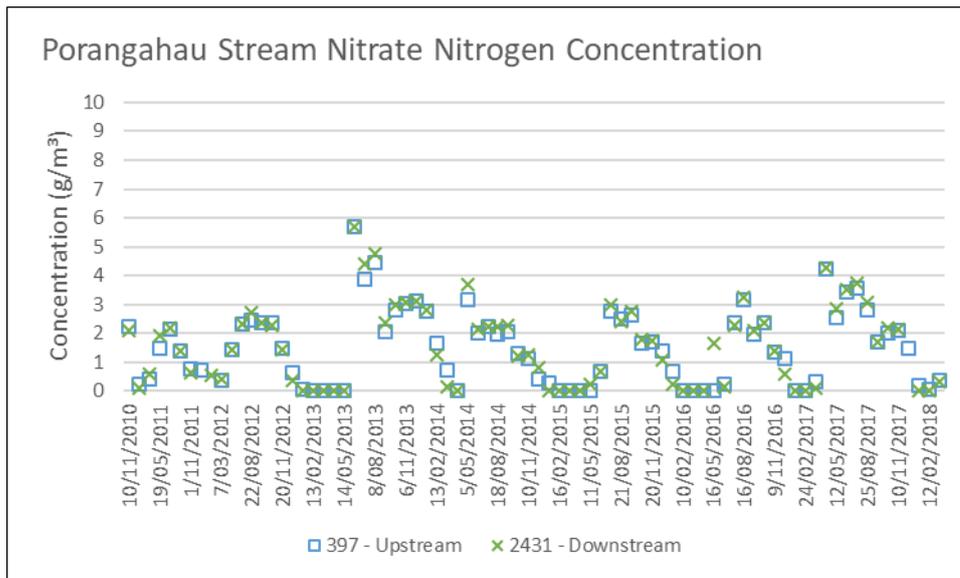
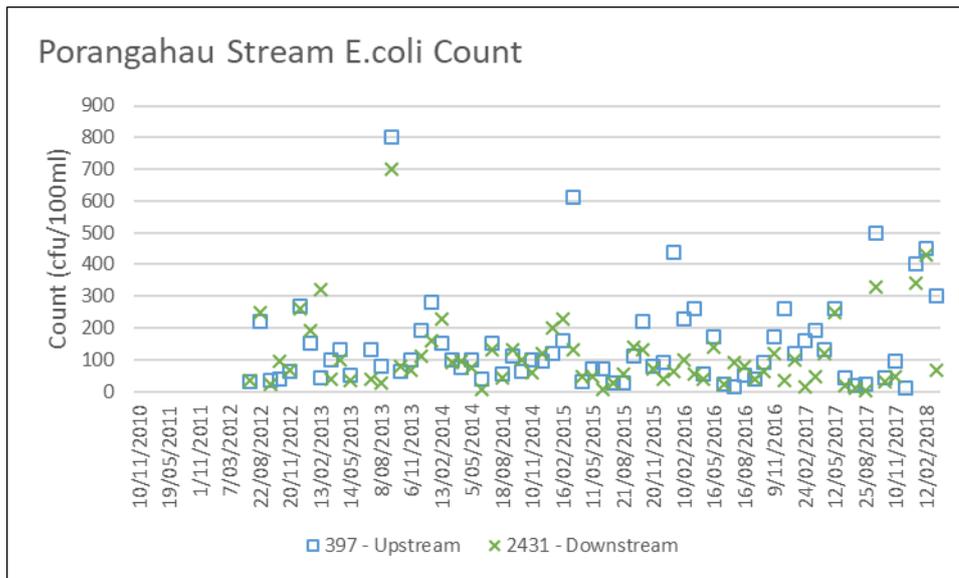


Figure 4.4.8.1(a): Porangahau Stream nitrate nitrogen concentration (Oct 2010 – Sep 2017).

Ammoniacal nitrogen concentrations at both locations are below 0.5 g/m^3 therefore are considered to have no effects on fish toxicity. Moreover, the maximum levels recorded meet the 95 % level of protection of 0.9 g/m^3 for freshwaters (ANZECC, 2000).

E. coli levels at the downstream site generally follow the same temporal trend as upstream, with the upstream site generally presenting more elevated levels (Figure 4.4.8.1(b)). On occasion, the *E. coli* levels are above the Ministry for the Environment (2002) bathing water quality guideline of 126 cfu/100ml. During these times, bathing within the stream would not be considered suitable. Given the contact recreational use of the Porangahau Stream within *the Operating Sites* property boundary is limited, and access to the stream is restricted from Fraser Road (fenced off on all private land), effects on recreational users can be considered less than minor.



NOTE: spike in monitoring results on 17 June 2013 removed.

Figure 4.4.8.1(b): Porangahau Stream E.coli count (Oct 2010 – Sep 2017).

As previously discussed, the application of wastewater or stockyard solids to land has the potential to produce run-off which could discharge into the Porangahau Stream. Silver Fern Farms Takapau have managed this through (but not limited to):

- Managing irrigators to reduce the potential for ponding or runoff.
- Providing reasonable buffer distances from the land disposal activities and the Porangahau Stream.
- Developing a wetland to prevent surface run-off from Block E from entering the Porangahau Stream via an ephemeral stream.

In concluding remarks, PDP state:

“...water quality results show no significant changes in measured parameters between the upstream and downstream sites, indicating no adverse effects on Porangahau Stream water quality from the wastewater discharges”. (p.p 62, s. 4.4, PDP Technical Assessment, June 2018).

It is therefore considered that effects on surface water to be less than minor.

4.4.8.2 Potential Effects on Macroinvertebrate Communities

Annual macroinvertebrate monitoring within the Porangahau Stream has been conducted since 2013. Monitoring is conducted to ascertain the current 'health' of the

macroinvertebrate communities. Sampling is conducted at the upstream and downstream monitoring locations, with an additional downstream site added in 2014 for better matching of site habitat characteristics upstream.

As sampling is conducted during the summer months, reductions in stream flow is likely to contribute to periphyton growth, in turn affecting the water quality and macroinvertebrate community structure.

Benthic monitoring from 2013 to 2018 indicate a substantial difference in taxa composition between the upstream and downstream sites. This is largely attributed to differences in physical site characteristics, including substrate and hydrology, and is the reason the alternative downstream site was added.

The upstream site has remained fairly stable in terms of taxa abundance, whereas the original downstream site has shown variation over time. In comparison, the alternative downstream site shows less variability between the sampling events, with comparable taxa compositions to the upstream site. Figure 4.4.8.2 below, provides a comparison of major macroinvertebrate taxa groups since 2013.

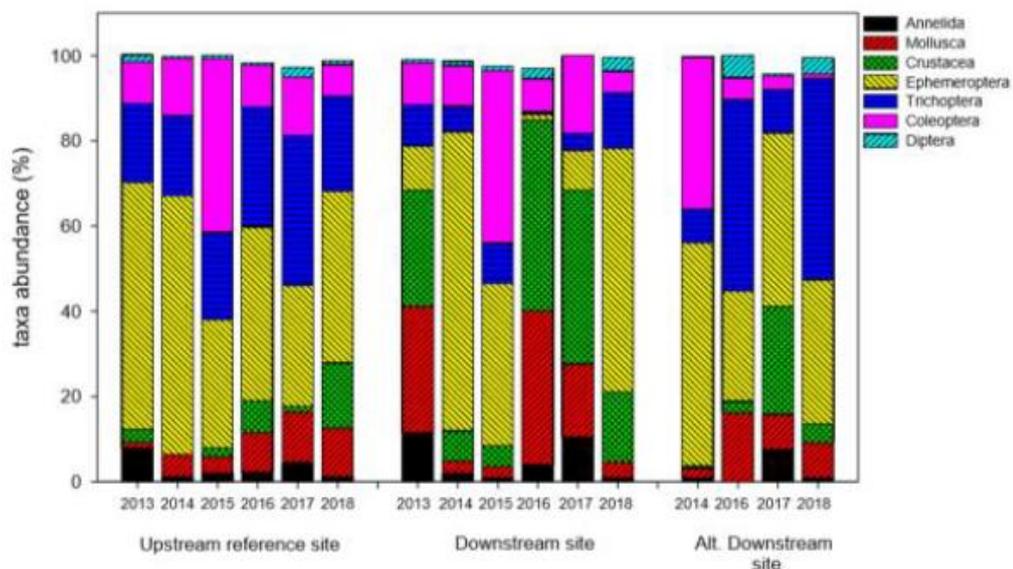


Figure 4.4.8.2: Macroinvertebrate sampling results 2013 - 2018 (Triplefin, 2018).

It is considered that the overall taxa diversity in the Porangahau Stream within Silver Fern Farms landholdings is moderate and indicative of a fair-moderately healthy stream.

Macroinvertebrate Community Index (MCI) scores at the upstream reference site and downstream site rated stream health to be on the lower end of the “good” category, while the alternative downstream site was within the upper reaches of the “fair” category.

The Quantitative Macroinvertebrate Community Index scores the upstream reference site and alternative downstream site as “good” and “excellent” for the downstream site.

PDP in their assessment concluded land-based discharges from Silver Fern Farms were not resulting in adverse effects on the in-stream macroinvertebrate communities of the Porangahau Stream.

“Benthic macroinvertebrate results, including MCI and EPT levels between the upstream reference site and the alternative downstream site, and the close proximity of the alternative downstream site to the Silver Fern Farms boundary suggests that the Silver Fern Farms discharge to land does not cause a significant adverse effect to the in-stream macroinvertebrate community of the Porangahau Stream”. (p.p 62, s. 4.4, PDP Technical Assessment, June 2018)

Effects on the in-stream macroinvertebrate community structure are therefore considered to be no more than minor.

4.4.9 Potential Effects on Human Health

Spray irrigation has the potential to generate aerosols which may carry animal pathogens and microbiological organisms harmful to human health. In order to minimise public contact and associated health risks with the application of wastewater to land, Silver Fern Farms have implemented a number of controls. This includes but is not limited to:

- Maintaining appropriate buffer distances between property boundaries and occupied dwellings;
- Maintaining shelter belts along sections of external property boundaries;
- Avoiding contact with wastewater through operational management controls – e.g. ensuring irrigation does not occur near a downwind boundary during windy conditions;



- Separating domestic wastewater from processing wastewater - domestic wastewater is generated within its own network and applied to its own land treatment area.
- Ensuring there is no public access to irrigation areas and therefore no exposure pathways.

Notwithstanding, microbial die-off in the irrigated areas is rapid and occurs primarily by desiccation (drying out) and ultra violet exposure. Based on these design and operational parameters, the risk posed by the exposure of pathogens and microbiological organisms on human health via spray irrigation is considered to be no more than minor.



5 DISCHARGE TO LAND – DOMESTIC WASTEWATER

5.1 Existing Treatment and Disposal

5.1.1 Oxidation Pond

Domestic wastewater is generated from ablutions, showers and kitchen facilities within the processing facilities (greywater from the main amenities was redirected to wastewater in 2009). It is collected within its own network, separate from processing wastewater, and is pumped to a dedicated 2,200 m² oxidation pond, located approximately 460 metres north-west of the animal assembly.

The pond has been constructed using a low permeability natural soil liner (bentonite) overlaid with a concrete liner and waveband. A baffle system has also been installed within the pond to increase settling time and improve wastewater quality. Treatment within the pond relies on sunlight, atmospheric oxygen and algal cells to assist the pond microbes to stabilise the wastewater.

Anecdotal evidence suggests that the pond has not been desludged however, assessments conducted by PDP in preparation for this consent renewal did not detect any odours or visual evidence of sediment build up, floating sludge or upwelling.

5.1.2 Land Treatment Area

Treated domestic wastewater from the oxidation pond is regularly discharged to a 1.6 ha border dyke network adjacent to the oxidation pond and Porangahau Stream, as shown in Figure 5.1.2 below.



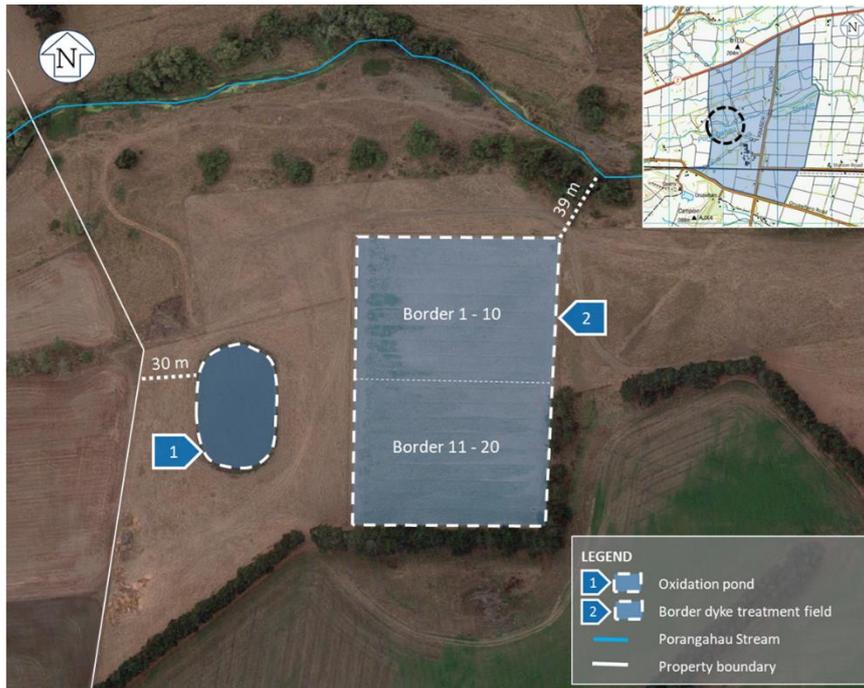


Figure 5.1.2: Indicative location of the domestic border dyke field and oxidation pond.

The land treatment area consists of 20 irrigation borders each 100 m long x 8 m wide with individual hydrants. The entire irrigation area is surrounded by an earth bund to prevent overland flow to the Porangahau Stream, closest point 39 metres.

During a discharge event, wastewater is applied to ten borders (1 – 10 or 11 – 20) once every three weeks on a six-week rotation, i.e. wastewater builds up for three weeks before being irrigated onto one of the two 8,000 m² areas.

Although generally operating well, at times the land treatment area experiences ponding. However, this has been observed to be rain water after heavy rain events rather than ponded wastewater. Anecdotal evidence also suggests issues with uneven distribution and preferential flows.

In line with Silver Fern Farms principals of continuous improvement, in 2016 both the internal and external borders were re-developed. This included raising the exterior boundary border, internal borders and re-levelling the gradient of the dykes to improve flow. In addition, further remedial work has been scheduled for raise the height of the eastern exterior border.

Given that conventional harvesting methods are unable to be conducted due to the nature of the border dyke system, plant growth is managed by grazing with short-

term low stocking ratios. When grazing is required, this is carried out in the week prior to irrigation; i.e. a five week stand down from the last irrigation event. Stock are held for a further 21 days before being sent for processing.

5.2 Discharge Quantity and Quality

5.2.1 Discharge Volumes to Land

The existing consent allows for the discharge of up to 750 m³ of wastewater onto ten borders once every three weeks. Historically discharges were calculated based on pump hours however following the installation of a flow meter in 2008, discharge volumes are now measured instantaneously.

As can be seen in Figure 5.2.1 below, discharge volumes have generally been below the limit of 750 m³, with a few exceptions during 2009.

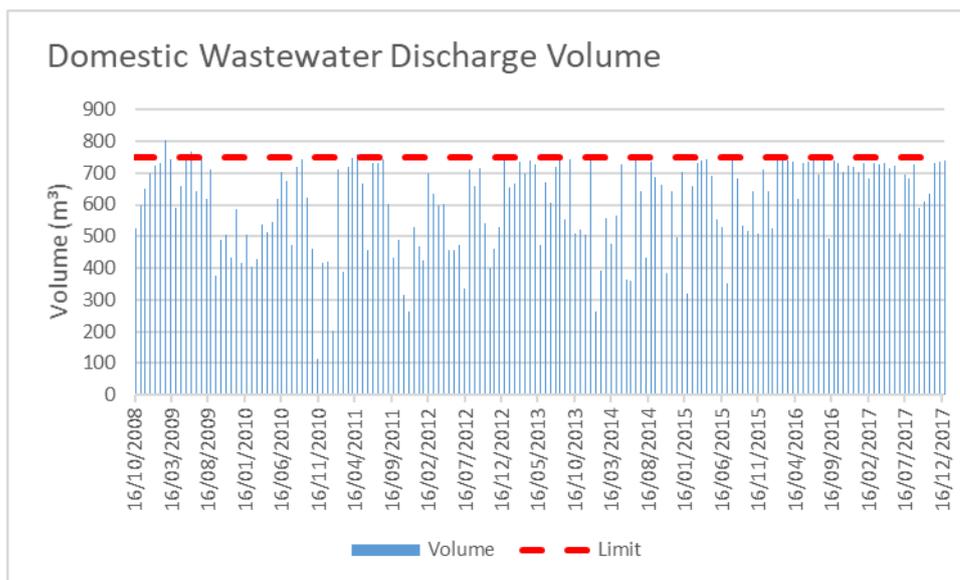


Figure 5.2.1: Domestic wastewater discharge volume (Oct 2008 – Sep 2017).

Discharge volumes are relatively constant throughout the year, with likely stormwater influences into the pond during the winter when rainfall is expected to be higher.

5.2.2 Discharge Quality

Silver Fern Farms Takapau conduct routine monitoring of the domestic wastewater discharge. Samples are required to be collected annually; however, biannual



samples have been collected since 2010. Samples are currently analysed for BOD₅ and total nitrogen.

As shown in Figure 5.2.2 below, analysis indicates that total nitrogen concentrations have fluctuated over the years, peaking at 60 g/m³ in 2010, but trending downwards to recent concentrations of less than 30 g/m³. Likewise, BOD₅ is variable and trending downwards.

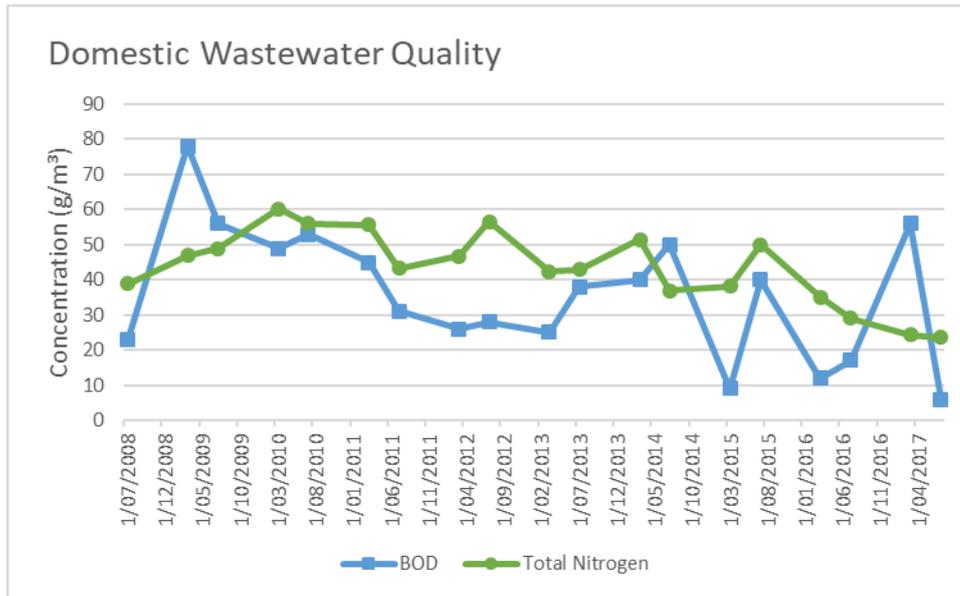


Figure 5.2.2: Domestic wastewater monitoring results (Jul 2008 – Sep 2017).

Overall, the oxidation pond appears to be operating well and is providing adequate treatment of the wastewater received. This is supported by PDP:

“The existing domestic wastewater management system is considered to be operating well, with the oxidation pond of suitable size and providing sufficient treatment for the following irrigation system”. (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

5.3 Mitigation Measures and Monitoring

Domestic wastewater application is managed as to mitigate any potential effects. Table 5.3 below summarises operations and associated mitigation measures in place.



Operation	Avoidance, remediation and Mitigation Measures	Aspect Managed
Buffer zones	<ul style="list-style-type: none"> • Earth bund surrounding the entire border dyke irrigation field. • Maintaining buffer distances from the property boundary. 	<ul style="list-style-type: none"> • Surface water • Odour • Runoff
Monitoring	<ul style="list-style-type: none"> • Silver Fern Farms Takapau carries out monitoring of activities and effects on a regular scheduled basis to ensure that activities remain within the on-site operational standards, and maintained within limits set by resource consents. • Monitoring results are provided to the HBRC. 	<ul style="list-style-type: none"> • Early response of trends. • Interpretive reporting

5.4 Assessment of Environmental Effects

The potential effects from the continuation of domestic wastewater discharges to land from Silver Fern Farms Takapau operations could be considered to be:

- Potential effects on soil quality and structure;
- Potential for nutrient leaching;
- Potential effects on groundwater;
- Potential effects on surface water; and
- Potential effects on air quality.

5.4.1 Potential Effects on Soil Quality and Structure

The application of wastewater to land using border dyke systems generally raises concerns regarding where levels of nutrients and trace minerals in the soils irrigated may rise or change in ratio over a period of time, in turn affecting the desired balance, or resulting in a higher than desired level of one particular component within the soils. Similar concern also arises where excess soil moisture can lead to ponding, runoff and contamination of groundwater.

For the purpose of this renewal, PDP carried out a visual soil assessment of the land treatment area to assess the general condition of the soils. Soil samples were also obtained and analysed for nutrients, heavy metals and permeability testing.

PDP in their assessment concluded:

- Soil conditions were classified as Moderate to Good.



“Based on a ranking of an overall scoring of <10 = poor, 10 – 20 = Moderate and >20 = Good, the conditions of the soils within the border dyke irrigation system can be assessed as Moderate to Good” (p.p 2, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

- Nutrient levels within the soils were good and within optimum range for pasture growth.

“Nutrient levels in the soils are generally within optimum range for pasture growth. Phosphorus is slightly elevated, though this would be expected for a land treatment system. Cation ratios in the soil are good with a low sodium level and a low exchangeable sodium percentage...” (p.p 3, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

- Concentrations of heavy metals were below guideline limits.

“Monitoring of heavy metals indicates that concentrations were well below guideline limits (refer to Table 3). On this basis, no adverse effects on stock or plant growth are expected. These are also well below the applicable guideline limits for the protection of human health in MfE (2011), and for nickel and zinc in NEPC (2013)”. (p.p 3, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

- Infiltration tests show that soils can potentially manage the current method of irrigation however can also be hydraulically constrained.

“The high infiltration rates measured by the K_{sar} and K_{40} testing indicates that the soils can potentially manage the method of irrigation (border dyke) however, the ponding at the south east corner may indicate that the method of irrigation is either too high for the soils or remedial action is required in parts of the irrigation area... it may be that a build-up of silt has occurred at this location, limiting macro-pore flow path ways and restricting drainage”. (p.p 4, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)



To mitigate, PDP have suggested that as a minimum:

“...the irrigation areas should be scarified to break up any silt sealing layer that maybe occurring”. (p.p 60, s. 4.1, PDP Technical Assessment, June 2018)

Overall, there would not appear to be a deleterious effect on soil quality and structure therefore potential effects are considered to be no more than minor.

5.4.2 Potential for Nutrient Leaching

In order to identify the level of nutrient leaching that could be expected from the existing treatment system, PDP modelled discharges using the OVERSEER nutrient modelling program. The model was run based on a grazed pasture system, with an assumed stocking rate of 20 sheep for the 2015 – 2016 processing season⁶.

Modelling outputs (Table 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum) indicate 100 kg/ha/yr of nitrogen loss and 3.9 kg/ha/yr phosphorous loss. As phosphorous loss is generally via run-off and transported by soil erosion, PDP considered the modelled loss:

“...unlikely as the entire irrigation areas is bunded”. (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

To put simply, there is no opportunity for surface runoff or loss of soil particles as these are contained.

The modelled nitrogen leaching loss of 100 kg/ha/yr was considered:

“...relatively high compared to the surrounding land use... but it is a significant improvement on the approximately 277kg TN/ha/yr that is applied to the irrigation system”. (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

However, when the domestic wastewater is looked at as part of the wider activity for the entire Silver Fern Farms land holding, the combined wastewater activities



(process wastewater, domestic wastewater and solids spreading) was modelled at a leaching loss rate through the soil of 17 kg/ha/yr. PDP stated that:

“The nitrogen leaching rate of 17 kg/ha/yr is considered reasonable when compared to the predominantly sheep and beef farming land use in the wider area.” (p.p 7, PDP Technical Memorandum, June 2018 – Appendix C: Process Wastewater Nutrient Memorandum)

5.4.3 Potential Effects on Groundwater

The oxidation pond and border dyke irrigation area is located up gradient of the main water supply bores to the plant. As there are no monitoring bores located directly down gradient of the border dyke system, water quality results have been accessed from the nearest production bore (Bore 6720), located approximately 580 metres east of the disposal area.

Bore 6720 is located in the deep aquifer and is believed to be recharged from the shallower aquifers. Average nitrate nitrogen concentrations within this bore is 3 g/m³, well within the NDWS of 11.3 g/m³. Moreover, there is no recorded instances of *E.coli* in the bore supply.

Considering limited monitoring data is available, PDP have recommended installing additional monitoring bores up and down gradient of the border dyke system to better assess the local impact from the discharge on groundwater. However, PDP have stated that:

“Overall, the available monitoring information indicates that an upgrade is not required to address adverse local effects” (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

Based on this, it is considered that the potential effects on groundwater to be no more than minor.

5.4.4 Potential Effects on Surface Water

Due to the border dykes close proximity to the Porangahau Stream (closest point 39 metres from stream), there is potential for the activity to impact surface water quality



if borders are overtopped. Direct overflow to the stream has been mitigated by surrounding the entire irrigation area with an earth bund.

As outlined in s. 5.4.2 above, OVERSEER modelling was used as an indicator of potential nutrient loss as a result of the discharge from the domestic system. Phosphorous is generally the main concern for surface water as it can lead to excessive algae growth, which can degrade river / stream habitats.

Modelling outputs (Table 5, PDP Technical Assessment, June 2018 – Appendix B: Domestic Wastewater Memorandum) show a loss, via run-off of 3.9 kg/ha/yr phosphorous. However, in their assessment, PDP states this is:

“...considered unlikely as the entire irrigation areas is bunded”. (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

and that;

“...impacts from this system and the other discharges on the Porangahau Stream is not evident in the regular consent monitoring undertaken.” (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

PDP concluded:

“...the available monitoring information indicates that an upgrade is not required to address adverse local effects”. (p.p 5, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

It is therefore considered that the potential effects on surface water to be less than minor.

5.4.5 Potential Effects on Air Quality

The general assumption is properly operated oxidation ponds should not create objectionable odours. Whilst musty odours can be detected occasionally within the immediate vicinity of the pond, odours are not offensive and become



indistinguishable within a short distance, nor are they detectible beyond the property boundary, some 30 metres away at the nearest point to the neighbouring farm and 860 metres to the nearest public road.

As previously mentioned PDP assessed the performance of the oxidation pond for this consent renewal. Findings concluded that the oxidation pond is working well, with no offensive odours detected:

“...the oxidation pond appeared to be operating well.” (p.p 2, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

and;

“...there was no odour from the pond”. (p.p 2, PDP Technical Assessment, June 2018 - Appendix B: Domestic Wastewater Memorandum)

Unlike spray irrigation, the current method of border dyke irrigation will result in minimal, if any, aerosol production. In the event that aerosols are generated from the irrigation hydrants, migration will be limited to a few metres.

As the land treatment area is bounded by the Porangahau Stream to the north and rural farmland to the west, east and south, the nearest dwelling is located more than 700 metres to the north-west. Given the predominant wind direction is away from this property and over company land, as shown in Figure 3.6, there is no potential for aerosols on this property.

During the term of the existing consent¹⁰ HBRC has one record of an odour complaint that has been noted as potentially relating to the operation of the domestic wastewater network. There is little information in the log and given the location of the oxidation pond and border dyke, it is hard to substantiate if these activities were the cause.

It is therefore considered that the potential effects on air quality from the domestic wastewater network (oxidation pond and border dyke irrigation) to be less than minor.

¹⁰ DP981040L



6 DISCHARGE TO LAND – STORMWATER

6.1 Existing Treatment System

6.1.1 Non-Potable Pond

As shown in Figure 6.1.1 below, located near the centre of *the Operating Sites* landholdings lies an irregularly shaped pond known as the “non-potable dam”. This pond is currently used to store untreated water which is reused throughout the site in processes that do not need to comply with the New Zealand drinking water standard.

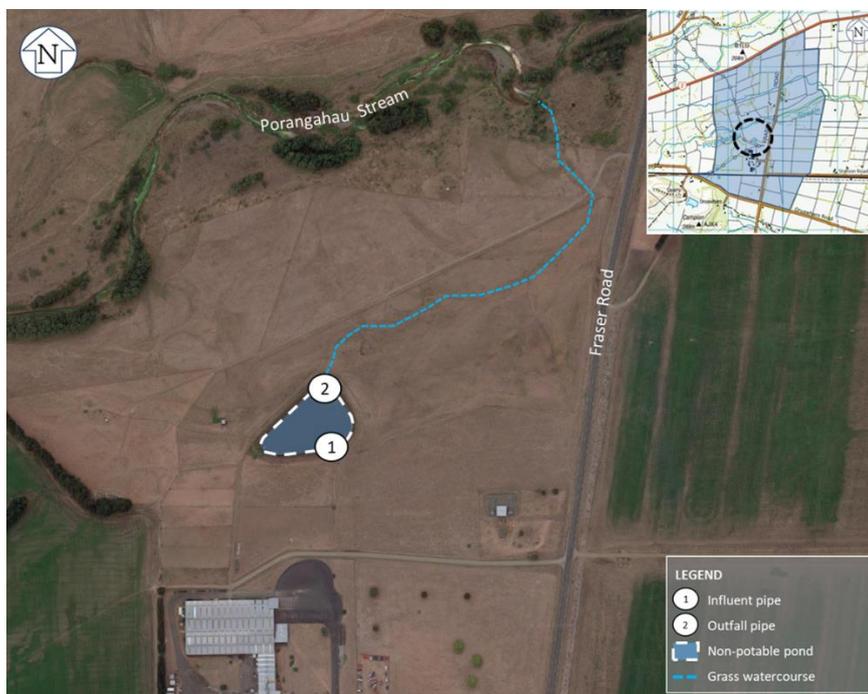


Figure 6.1.1: Indicative location of non-potable dam and natural grass watercourse.

The pond occupies an area of approximately 0.6 ha and has been constructed using a low permeability natural soil liner (bentonite) to create a durable seal. Given the lack of regular dimensions, it is difficult to calculate the actual ponds volume. However, it is estimated to have a surface area of 5,250 m² when full, a depth of 3.4 metres and an overall storage capacity of 11,000 m³.¹¹

During typical operation, the volume in the pond is usually kept around three quarters full (equating to approximately 8,250m³), providing a buffer should there be

¹¹ Richmond Limited – Takapau 'Resource Consent Application and Assessment of Environmental Effects of the Discharge of Stormwater to Land'. Ric 05, June 1998.

substantial rainfall event and to protect the Porangahau Stream should a significant spill occur onsite.

6.1.2 Influent Sources

At present, influent to the pond is received from the following sources, these are discussed in greater detail in s.6.1.4 – 6.1.8:

- Stormwater – rainfall runoff from roofs and hardstand surfaces;
- Cooling plant defrost water;
- Backwash water from the sand filter; and
- Untreated groundwater from production bores.

Historically the pond received rendering plant cooling water; however, following the closure of the onsite rendering operation in 2014, influent from this source is no longer generated. In addition, stormwater collected across the DAF concrete pad is processed through the DAF, which is part of the wastewater treatment system, before being directed into the wastewater storage pond.

6.1.3 Treatment

The influent streams are discharged to the pond via a single pipe located at the southeast corner of the pond. Retention within the pond is largely contingent on the depth of the pond, processing demands and climatic conditions. However, the majority of the water is pumped back to the plant via a reticulation system. This is then reused for stock washing, animal assembly yard cleaning, gut washing, screen washing, flushing wastewater pipelines and emergency firefighting purposes, before ultimately discharging to land as wastewater⁴.

As shown in Figure 6.1.1 above, water from the non-potable pond has the potential to provide an overflow discharge through a concrete pipe at the northern corner of the pond, discharges from this pipe are not metered. The overflow outfall runs down a culvert into a grass channel which meanders approximately 450 metres before discharging into the Porangahau Stream.

In the event that this discharge occurs, the grass watercourse provides treatment via filtration and adsorption through the soil profile and filtration through grasses in a lateral direction.



6.1.4 Stormwater Discharge

6.1.4.1 Catchment Characteristics and System

The site comprises of four individual stormwater sub-catchments with an overall drainage area of 13 hectares. These catchments are sealed or covered by buildings, with the remaining areas grassed or gravelled. Grassed and gravelled areas allow some soakage of rainfall to ground thereby reducing runoff volumes into the stormwater network.

Figure 6.1.4.1 below shows a detailed delineation of the sub-catchments within the Silver Fern Farms Takapau plant. Details on each sub-catchment is summarised below.



Figure 6.1.4.1: Indicative location of the stormwater sub-catchments at Silver Fern Farms Takapau.

6.1.4.1.1 Sub-catchment A

Sub-catchment A provides drainage for hardstand areas and roof surfaces across majority of the plant. The area of sub-catchment A is approximately 10 hectares, encompassing 6 hectares of hardstand and roof surface, and 4 hectares of grass or

gravelled surface. All stormwater generated within this catchment is discharged to the non-potable dam for reuse across the areas identified in s. 6.1.3.

6.1.4.1.2 Sub-catchment B

The area of sub-catchment B is approximately 0.1 hectares of hardstand surface. Sub-catchment B provides drainage from the DAF plant, paunch grass dewatering area, and the area where the tallow tanks and rendering raw product bins were stored prior to being decommissioned in 2014. Stormwater collected in this sub-catchment is discharged to the wastewater network prior to being irrigated to company owned land⁴. There are no grass or gravelled surfaces directed to the wastewater network.

6.1.4.1.3 Sub-catchment C

Sub-catchment C provides drainage for the main access driveway into the plant, main car park and roof surfaces from the office, laboratory and fire station. The area of sub-catchment C is approximately 2 hectares, encompassing 1.6 hectares of hardstand and roof surface, and 0.4 hectares of grass or gravelled surface. All stormwater generated within this catchment is discharged to numerous soak holes surrounding the identified areas. There are no treatment devices in this catchment.

6.1.4.1.4 Sub-catchment D

Sub-catchment D provides drainage from the grassed / gravelled areas and roof surface of the loadout bay (approximately 0.9 hectares). Stormwater generated within this catchment is discharged to a sump before being pumped to the wastewater storage pond prior to being irrigated to company owned land⁴.

6.1.4.2 Rainfall and Stormwater Volumes

The actual volume of stormwater generated in the catchment at any one time is determined by the intensity of a rainfall event, duration, area of the catchment and runoff rates. It is important to note that not all rainfall converts to runoff, a percentage will 'wet' the area and in effect be negated by evaporation or absorption to soil.

To test the stormwater and discharge system for extreme rainfall events the system needs to be modelled for both a short duration high intensity storm and a long



duration medium intensity storm. To do this, rainfall frequency duration data from the National Institute of Water and Atmospheric Research (NIWA) High Intensity Rainfall Design System (HIRDS V3) has been used and is included as Appendix Seven.

Discharge rates and volumes are calculated with the rational method for stormwater design. $Q = CIA$ (Q – Peak discharge, C – Co-efficient, I – Rainfall Intensity, A – Drainage Area) with a run-off co-efficient of 0.9 for the impervious areas and 0.5 for the grassed / gravelled areas.

6.1.4.2.1 Short Duration – High Intensity Storm

From HIRDS V3 a 1 in 10 year high intensity rainfall with a duration of 30 minutes will yield 20.4 mm of rain (40.8 mm/hr).

The flow from impervious areas will be 606 L/s and 224 L/s from grassed / gravelled areas, giving a combined maximum flow rate of 831 L/s. Over the duration of the 30-minute storm (1 in 10 year), this will equal a volume of 1,497 m³. This will not exceed the storage capacity of the pond (11,000 m³) providing it is less than 85 % full, which is almost always the case.

6.1.4.2.2 Long Duration – Moderate Intensity Storm

A longer duration storm (e.g. 24 hours) may be a worst-case scenario for the pond. From HIRDS V3 a 1 in 10 year storm of 24 hours duration has a depth of 112.8 mm of rain (4.7 mm/hr).

The flow from impervious areas will be 69 L/s and from pervious areas 25 L/s giving a combined maximum flow rate of 96 L/s and a volume of 8,278 m³ over 24 hours. This is less than the volume of the pond (11,000m³) but unless the pond is less than 15 % full, the pond will overflow at a rate of 96 L/s. However, storm events of this duration and intensity are generally forecastable and allow for forward planning to manage the pond level prior if required.

Anecdotally there have been several significant rain events over the past 10 years but these have not resulted in any observable overflow to the grass watercourse. This is supported by the site Engineer who has rarely observed any overflow from the pond.



The climate change guidance manual (MfE 2008) predicts a 2 °C warming by year 2100. The atmosphere can hold about 8% more moisture for every 1°C increase in temperature which means that heavy rainfalls could potentially increase by 16 % by year 2100. As Silver Fern Farms are only seeking a 10-year consent term, impacts of climate change are likely to be negligible over this term. However, the large retention capacity of the pond would provide sufficient buffer to accommodate the predicted increase from climate change over a longer period.

As the pond has a large capacity and majority of the volume is reused throughout the plant, Silver Fern Farms do not believe there is any requirement to alter the size of the non-potable pond to accommodate any increasing peak rainfall intensities. Moreover, anecdotal evidence suggests that there have only been a few instances when discharges to the watercourse have occurred, none of which occurred during the existing consenting term.

6.1.5 Cooling Plant Defrost Water

Freshwater from the potable groundwater bores is used for defrosting and the operation of the refrigeration plant. Defrost water is discharged to the non-potable pond at rates dependent on what processes are happening at the site. On average this is approximately 300 – 700 m³/week. This water is considered 'clean' as it does not come into contact with anything other than the cooling system.

6.1.6 Sand Filter Backwash

Maintaining a high quality of water is paramount to sustaining Silver Fern Farms Takapau's export food processing operation. High manganese levels in the deep aquifer water supply may cause bacterial flocs and precipitation of black specs on product. To avoid these risks, potable bore water is passed through a sand filter before being utilised within the site.

As part of the operational process, the sand filter is backwashed with freshwater from the potable groundwater bores to remove minerals, principally iron and manganese. Water generated from the backwash process is then discharged to the non-potable pond.



6.1.7 Rendering Plant Cooling Water

As previously mentioned, onsite rendering activities ceased in 2014 and as a result cooling water from this process is no longer discharged to the non-potable pond.

6.1.8 Untreated Bore Water

Silver Fern Farms Takapau currently hold Resource Consent WP981038Tb which permits the abstraction of groundwater from six consented bores for processing requirements. Correspondingly, water is abstracted from any or all of the consented groundwater bores and used to make up the volume of the non-potable pond as required, for subsequent use across plant operations.

6.2 Mitigation Measures and Monitoring

Discharges to the non-potable pond are managed as to mitigate any potential effects on the receiving environment. Table 6.2 below summarises operations and associated mitigation measures in place.

Table 6.2: Mitigation measures and monitoring for non-potable pond and associated processes		
Operation	Avoidance, remediation and Mitigation Measures	Aspect Managed
Non-potable pond	<ul style="list-style-type: none"> Non-potable pond has been constructed using bentonite creating a durable seal reducing the potential for contaminants to seep into groundwater. The outfall of the non-potable pond can be manually shutoff in the unlikely event of contamination. This will reduce the potential of contaminants entering the Porangahau Stream via the natural grass waterway. Allows sediment particulates to settle in bottom of pond. 	<ul style="list-style-type: none"> Groundwater Surface water
Hazardous substance storage	<ul style="list-style-type: none"> Chemicals, materials and hazardous substances at the site are managed in accordance with all manufacturer / supplier management plans and well as all legislative requirements. In the event of a spill, spill containment procedures will be implemented. This includes the use of spill kits and or isolation. 	<ul style="list-style-type: none"> Chemical storage Spill containment
Stormwater drain identification	<ul style="list-style-type: none"> All stormwater drains have been identified by a companywide standard. 	<ul style="list-style-type: none"> Company standard
Waste / by-product storage	<ul style="list-style-type: none"> There are a number of designated storage areas where wastes and by-products are temporarily stored before being removed offsite. 	<ul style="list-style-type: none"> Strategy for process operations



6.3 Assessment of Environmental Effects

The potential effects from stormwater discharges to land or water from Silver Fern Farms Takapau operations could be considered to be:

- Potential effects on soils / plants; and
- Potential effects on surface water.

6.3.1 Potential effects on Soils / Plants

Backwash water is likely to contain minor traces of iron and manganese oxides. It is unlikely that these elements will be of significance as concentrations are low within groundwater across the Takapau area; and oxides are likely to settle out in the non-potable pond as it rarely overflows.

Additionally, backwash water has low chlorine concentrations (approximately 1.6 g/m³) from the chlorine treatment system. This is not considered significant as average chloride concentrations in the wastewater discharged to land is 83.6 g/m³.

In the event of a significant rain event that results in the non-potable pond overflowing, the 'first flush' may contain contaminants that will be captured in the pond. As the level within the pond increases, the influx of potential contaminants will decrease and the increase in volumes will decrease the concentration of contaminants already present. When the pond has reached the level at which overflow occurs, rainfall has been consistent for a period of time and the volume of water present in the pond means that contaminant concentrations are likely to be highly diluted and low.

Given the pond is lined with bentonite there is likely to be no movement of any contained material into the underlying soils. Moreover, as the non-potable pond rarely overflows and contaminant concentrations are expected to be low, it is considered the potential effects on soil and plants to be less than minor.

6.3.2 Potential effects on Surface Water

The large size of the pond provides a relatively long retention time, giving sediment and metal oxides time to settle out. The large volume of the pond and volume of water present means that contaminant concentrations are likely to be low.



The Porangahau Stream is located north of the non-potable pond. In the event of an overflow, water has to meander approximately 450 metres through a grass channel before discharging into the stream. The grass channel will provide treatment via filtration and adsorption through the soil profile and filtration through grasses in a lateral direction.

Given the relatively long retention time, likely low contaminant concentrations and the fact that the pond rarely overflows, it is considered the potential effects on the Porangahau Stream to be less than minor.



7 DISCHARGE EMISSIONS TO AIR

7.1 Overview

As outlined in Table 1.1, *the Operating Site* holds a number of resource consents that permit the discharge of contaminants to air from the processing plant and associated ancillary activities.

Discharges to air from onsite activities are now of much lesser scale and significance than as described in the 2002 consent renewal. In recent years, as part of *the Company's* strategy, rendering / blood-drying operations have been disestablished and boiler operations downsized. This has resulted in significant changes to the scale and intensity of discharges to air from the Silver Fern Farms Takapau plant.

7.2 Sources of Emissions to Air

Figure 7.2 below shows the site layout and the principal areas where emissions to air are, and were, discharged. Each of these activities are discussed in detail below.

Note: discharges to air associated with wastewater irrigation (processing / domestic) and stockyard solids disposal are covered under their respective sections within this AEE (s.4 and 5).



Note: processing facilities are located across the entire site.

Figure 7.2: Indicative location of the principal air discharge sources.

7.2.1 Boiler Operation (Down-sized)

As previously mentioned, boiler operations have been downsized during the term of the existing consent¹². In 2013, following the closure of Titan Meats (a joint venture company formally known as Process Products), the plant removed the 950 KW natural gas fired boiler that was used to provide hot water for cooking processes. As a result, Silver Fern Farms will not be reapplying to use the boiler in this application.

The Takapau plant currently operates one main 4.8 MW boiler and two 1.8 MW water heaters, all fuelled by natural gas (total available 8.4 MW). The main boiler is used to generate steam through a heat exchanger while the two smaller water heaters, which operate below 100°C, are used for hot water production; principally providing hot water for sterilisation and cleaning requirements. The boilers do not have specific operating hours and are run as required to support daily processing at the site.

All of the boilers have provisions to run on diesel as an emergency backup. To ensure that the diesel pumps are maintained in a workable state, the boilers are routinely run for short periods (approximately half an hour per month).

Notwithstanding, the boilers have not been required to run under emergency provisions during the term of the existing consent as there has been a consistent supply of natural gas fuel.

All three boilers discharge through individual stacks sized to match each boiler's performance. All three boiler stacks are greater than 13 metres in height.

The site routinely employs an independent contractor to perform boiler maintenance, flue gas testing and operational / efficiency diagnostics. This also completes legislative requirements for the operation of the boilers.

7.2.2 Wastewater Treatment

As outlined earlier (s. 4.1), wastewater from the plant passes through a series of primary screens (contrashears) and a DAF before being pumped to the wastewater storage pond located south-west of the plant. Wastewater is then discharged to land via spray irrigation.

¹² DP030579A



There is likely to be some emissions to air, including potential for the discharge of odour from the wastewater handling and operation. The range of potential emissions to air include:

- Steam from in-flow process water;
- Localised spray drift onsite – from the primary screening process;
- Localised odours from the primary process itself due to the displacement of air during screening; and
- Localised odours during the DAF treatment process including the transferal and collection of solids for offsite processing.

7.2.3 Rendering Processes (Disestablished)

For the greater part of this consent term¹³, the rendering plant at *the Operating Site* processed inedible raw materials (soft offal, bones) into meal and tallow. The site also operated a hydrolysing unit that removed wool from heads and hocks prior to rendering.

Raw materials generated onsite, as well as material received from shared services across Silver Fern Farms operations, were processed through a high temperature-rendering cooker. During this process, tallow was separated and the liquid generated (stickwater) was combined with the plants wastewater stream. Once cooked, solids were transported by conveyor to the meal press. Meal processing stages included milling, bagging and load out which produced some odour but of a relatively neutral character and far less significant than cooking and drying related odours.

Blood was also received from shared services and onsite operations and dried in a vertical ring drier after being pumped through a coagulation unit and centrifuge. Discharges from this process were passed through a condenser / heat exchanger, where they were cooled before being discharged into the atmosphere.

In 2014, as part of the *The Company's* strategy, both rendering and blood-drying activities ceased at the Takapau site. All by-products generated from onsite activities are now removed offsite and processed by a third party. The closure of the rendering / blood-drying operation means that:

- The cooking of renderable material (soft offal, bones) at Takapau has ceased;

¹³ DP020333A



- Drying of meal at Takapau has ceased;
- The collection and storage of tallow at Takapau has ceased;
- Odorous discharges from the condensers are no longer being generated therefore are not incinerated through the stream boiler; and
- The use of the hydrolysing unit has ceased – this has been completely removed from the processing line.

Given this, Silver Fern Farms are not including discharge emissions to air from rendering processes, meal processing, blood drying and the operation of a hydrolysing unit in the renewal.

7.2.4 Fugitive Sources

Largely, other emissions at Silver Fern Farms Takapau are from a number of sources of 'fugitive' locations. These emissions are generally of low velocity and noticeable within the immediate vicinity of the source, but quickly disperse and are indistinguishable with a short distance. The remaining part of this sub-section, s.7.2.4.1 - 7.2.4.5, summarises the sources of fugitive emissions from onsite operations.

7.2.4.1 Animal Assembly (Stockyards)

Stock is transported to the plant via stock trucks and unloaded into the animal assembly. Stock is then placed in pens and depending on species and condition, are washed prior to processing.

The animal assembly is roofed with open sides to allow natural light and ventilation. The holding areas have concrete floors with elevated gratings overtop. The potential emissions to air from this activity include methane and carbon dioxide from animal manure and the general odour of live animals. An observer standing immediately downwind of the stockyards would perhaps detect a characteristic manure and warm animal smell.

Regular cleaning of the yards to prevent the accumulation of manure in the holding areas is the most effective way of controlling and minimising odours. Cleanliness of the yards is monitored closely by regulatory and company technical staff. Wastewater



generated from yard washing is discharged to company owned land via spray irrigation. Stockyard solids are also applied to land.

These emissions generally have no lasting environmental effects as they are localised and quickly disperse within a short distance. The resultant odours are typical of general farming activities observed across the Central Hawke's Bay Region.

7.2.4.2 Processing Facilities

Fugitive emissions are discharged via exhaust vents, open and mechanical, across the site. They can be both continuous (the operation of equipment supplying freezer and chiller operations) or temporary / intermittent emission (resulting from the malfunction of equipment, maintenance, or plant wash down). Essentially, since the proportion of contaminants in the exhaust ventilation is a property of the process, it does not vary significantly. This means that the quality of contaminants, and any resultant odour, discharged to air will be consistent with that process.

All processing areas within the plant are ventilated. Areas such as the primary and secondary butchery have minimum ventilation requirements and internal working temperatures regulated for both good working environments and adherence to export standards that the plant operates under. The air discharged may have a slight odour, characteristic of meat processing and reminiscent of a butchers shop. Building ventilation air will also contain contaminants to the extent that it has a different temperature to ambient outside air and will contain water vapour from maintaining clean working conditions but will not be saturated.

Heat is discharged into the atmosphere as a consequence of a number of air conditioning units located on the roofs of buildings. These units discharge the extracted air at roof level where immediate dispersion occurs. Any odour associated with these discharges is not apparent at roof level nor is it detectable at the property boundary.

7.2.4.3 Engine Room and Refrigeration Equipment

The Takapau processing operation operates a two-stage totally enclosed ammonia refrigeration system. Cooling of the high discharge gas is done via evaporative cooling through this process water and steam vapour is discharged to the



atmosphere. The total volume of ammonia held at the site is approximately 20 tonnes.

7.2.4.4 Laboratory Discharges

The Takapau Laboratory is located adjacent to the main office building and services Silver Fern Farms operations in the North Island. There are various vents to air throughout the facility from room exhaust fans and fume-hoods over work areas to purpose built fume-cupboards.

As with most laboratories, small amounts of solvents and odours are released in day-to-day activities which are then removed from the working environment and discharged to air through the various vents etc. The airflow is maintained in the laboratory such that it provides a safe and healthy working environment and is sufficient to provide adequate dilution of potential contaminants in the discharged to air.

7.2.4.5 Storage of By-products / Waste

There is no fellmongery or operational rendering facility onsite, by-products including blood, skins / hides, offal or raw material are stored onsite in either lidded drums, open bins or specifically built transfer bins.

Localised odours are evident within the immediate vicinity of the storage areas however quickly dissipate within a short distance. These odours characteristically smell of fresh viscera and blood. To ensure odours are minimised and to avoid spoilage, by-products are removed daily and sent offsite for further processing.

7.3 Mitigation Measures and Monitoring

Discharges to air from meat processing and ancillary activities are managed to mitigate any potential effects. Table 7.3 below summarises operations and associated mitigation measures in place.



Table 7.3: Mitigation measures and monitoring for domestic wastewater		
Operation	Avoidance, remediation and Mitigation Measures	Aspect Managed
Weather station	<ul style="list-style-type: none"> Wind speed and direction are monitored by an onsite weather station and wind sock. 	<ul style="list-style-type: none"> Odour
Storage of by-products / waste	<ul style="list-style-type: none"> By-product materials are removed offsite daily. 	<ul style="list-style-type: none"> Odour
Animal assembly	<ul style="list-style-type: none"> Stockyards are routinely cleaned to prevent the accumulation of solids. Silver Fern Farms supports the Animal Welfare (Transport within New Zealand) Code of Welfare 2011; this code suggests that stock should be held off pasture for a minimum of four to twelve hours before transport to allow for the animals to partially empty out. This aids in reducing the effects on the stock during transportation and the quantity of effluent generated within the stock truck and yard. 	<ul style="list-style-type: none"> Odour Wastewater
Boiler	<ul style="list-style-type: none"> Routine checks are conducted to ensure that the boilers are operating correctly. 	<ul style="list-style-type: none"> Boiler operation
Ammonia	<ul style="list-style-type: none"> If a major ammonia leak were to occur, any response will be managed by the appropriate emergency response team. This includes the use of the NZ Fire Service and the Silver Fern Farms Takapau onsite emergency response team. 	<ul style="list-style-type: none"> Odour Health and safety

7.4 Assessment of Environmental Effects

The potential effects from the continuation of emissions to air from Silver Fern Farms Takapau operations could be considered to be:

- Potential effects from boiler emissions to air; and
- Potential effects on the nearest dwellings.

7.4.1 Potential Effects from Boiler Emissions

Discharges to air from the operation of gas-fired boilers results in two main contaminants, carbon monoxide and nitrogen dioxide. Previous modelling¹⁴ showed combustion products would be less than ambient air quality guidelines. Given that boiler operations have been downsized during this consent term, with the removal of the 950 KW gas fired boiler, effects will be less than the currently consented activity. With levels previously modelled to be below ambient guideline levels and considered to be dispersed adequately within the receiving environment, there will be no more than minor effect.

¹⁴ Conducted for the 2002 consent renewal



Combustion products of hydrocarbon fuels mainly consist of water, carbon monoxide, and carbon dioxide. Impurities of sulphur and nitrogen produce mono nitrogen oxide and sulphur oxide gases which are considered a risk to human health. To reduce this, the sulphur content of diesel is controlled by the Engine Fuel Specification Regulations 2011 (Schedule 2). Refineries generally manufacture diesel to a sulphur limit below the maximum allowable standard of 10 mg/kg (0.001%). Given that the boilers have only been run using diesel for short periods during routine testing, effects from this fuel are considered less than minor.

Visual observations carried out by Silver Fern Farms during the term of the existing consent did not identify any visible smoke being discharged from the chimney stack. Moreover, there have been no complaints received from the public or through the Hawke's Bay Regional Council as a result of boiler operations during the existing consent term.

Given that there is no fundamental change, and wind dispersion is predominantly over rural farmland (as shown in wind rose, Figure 3.6), it can be considered that any continued effect from the boiler operation at the Takapau plant will be less than minor.

7.4.2 Potential Effects on Nearest Dwellings

Given that *the Operating Site* is located in a rural environment, has large buffer distances to the nearest dwellings and wind speeds are generally low mass (as shown in Figure 3.6), discharges to air from current onsite activities are considered to be negligible under most circumstances.

Existing emissions are only noticeable close to the source before becoming indistinguishable within a short distance and not detectible beyond the property boundary. Moreover, the discharge of odorous compounds is largely minimised by good housekeeping and regular cleaning of all areas to prevent the build-up of any organic material that could produce adverse odour effects.

Anecdotal evidence suggests that odour complaints were previously received in relation to the now redundant rendering and blood drying operations. With the closure of the rendering and blood-drying facilities in 2014, the potential for odours to be generated has further reduced. It could easily be argued these closures have overall enhanced the Takapau receiving environment.



It can therefore be concluded that the degree of any remaining potential sources of odorous material from the Takapau Plant would only result in localised effects of a minor nature. Thereby, the effects on the nearest dwellings is considered to be less than minor.



8 STATUTORY AND PLANNING CONSIDERATIONS

8.1 Overview

In order to satisfy s.104 of the Resource Management Act 1991 and to determine the nature of the consents required, regard needs to be given to the provisions of several planning and statutory documents of relevance to the consent renewal. These are as follows:

National statutes and documents:

- The Resource Management Act 1991.
- Resource Management (NES for Sources of Human Drinking Water) Regulations 2007
- National Policy Statement for Fresh Water Management 2014 (NPS-FW)
- Biosecurity (Ruminant Protein) Regulations 1999

Regional documents:

- Regional Policy Statement (RPS)
- Regional Resources Management Plan (RRMP)

8.2 National Documents

8.2.1 Resource Management Act (RMA)

The Resource Management Act and its amendments is the fundamental piece of legislation in New Zealand which sets restrictions on land use and development, discharges, water use and waste disposal to ensure adverse effects of activities on the environment are appropriately managed.

Of particular relevance to the resource consent renewal is:

Part 2 – Purpose and principals

- Section 5, the purpose of the RMA, is to promote the sustainable management of natural and physical resources and refers to:
 - ‘... *safeguarding the life-supporting capacity of air, water, soil and ecosystems*’.



Consistent with this aspect of Section 5, the activities described in this AEE do not adversely impact on the life-supporting capacity of air, water, soil and ecosystems.

- Section 6(a) to 6(g) of the RMA, matters of national importance. Moreover, section 6 (e) of the RMA requires all persons exercising functions and powers under it to recognise and provide for:

‘The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga’.

Silver Fern Farms recognise the relationship with Maori and their culture and traditions with their ancestral lands, water, sites of wahi tapu and other taonga. As such, Silver Fern Farms consulted with the Tangata whenua of the area, who provided a CIA (Appendix Five).

- Section 7(f) of the RMA, requires persons acting under the RMA in relation to managing the use, development and protection of natural and physical resources to have particular regard to:

‘Maintenance and enhancement of the quality of the environment’.

Whilst the historic consented application of wastewater to land resulted in elevated nitrates in the groundwater, improvements to land management and additional monitoring implemented through the term of the existing consent appear to have been successful in reducing overall effects, thereby enhancing the quality of the receiving environment. In applying the wastewater and solids to land in a sustainable manner, Silver Fern Farms use the nutrients as a natural resource with the resultant crops on sold.

Part 3 – Duties and restrictions under this act

- Section 15(1)(c) and (d), discharge contaminants into environment, states:
‘No person may discharge any contaminant from any industrial or trade premises into air or onto or into land unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.’



The Applicant is currently consented to discharge contaminants to air (DP020333A, DP030579A and DP981044Ad) and land (DP981039Lb, DP981040L, DP981041L and DP981043Ld). These permits were issued by the HBRC and are due to expire in December 2018. This AEE seeks to renew these consents.

Part 6 – Resource Consents

- Section 88 of the RMA sets out the information that must accompany a resource consent application. This application for consent renewal has been provided in accordance with the provisions set out in Schedule 4 of the RMA.
- Section 104 (2A) of the RMA requires that when considering an application, the consent authority must have regard to the value of the investment of the existing consent holder. Silver Fern Farms has considerable capital sunk into the Takapau operations and is an integral part and strategic site for Silver Fern Farms and the wider farming community, employing approximately 1,100 personnel during peak season. If the operation were to close, the sunk capital items would largely not be recoverable, and staff would likely find employment in the district, if not region, difficult to obtain.
- Section 124 of the RMA allows a consent holder to exercise their existing consent while a new consent is being determined. Since Silver Fern Farms have applied for new consents within 6 months of their expiry, section 124 applies to this consent renewal application.

8.2.2 NES for Sources of Human Drinking Water Regulations

NES for Sources of Human Drinking Water Regulations deal with resource consents for water or discharge permits upstream of drinking water abstraction points. These sections apply to activities that have the potential to affect registered drinking water supplies.

The Central Hawke's Bay District Council's Takapau Township bore is located up gradient of the discharge site and the Waipukurau Township Water supply is approximately 9 km east of the site. It is highly unlikely that the discharge of wastewater and stockyard solids is likely to increase any of the determinants at the



abstraction points nor increase the concentration of any aesthetic determinants above guideline values.

8.2.3 National Policy Statement for Freshwater Management

The National Policy Statement for Freshwater Management is included in the RRMP as policies 72A and 76A and those additional policies for the Tukituki River Catchment which seek to avoid adverse effects to the life supporting capacity of freshwater and have been addressed in the RRMP section.

8.2.4 Biosecurity (Ruminant Protein) Regulations

The Biosecurity (Ruminant Protein) Regulations and its subsequent amendments control the feeding of ruminant animals (sheep and cattle) with animal protein based feeds. This includes the irrigation of wastewater and stockyard solids onto pasture grazed by or harvested for feed for ruminant animals. To minimise the risk and meet the requirements of these regulations, Silver Fern Farms set minimum withholding periods following wastewater and / or solids applications before stock may graze pastures or crops are harvested for feeding to animals.

8.3 Regional Documents

8.3.1 Regional Policy Statement

Chapter 3 of the RRMP contains the objectives and policies of the Regional Policy Statement (RPS). Those with particular relevance to the proposed activity are listed in Table 8.3.1 below:

Issues	Objective	Policies
3.5 Effects of conflicting Land Use Activities	17	8
3.7 Management of Organic Material	20	11,12, 14
3.8 Ground Water Quality	22, 21, 21, 27	16,17, 48, 49
3.10 Surface Water Resources	27	47
3.14 Recognition of Matters of Significance to Iwi / Hapu	34, 35, 36, 37	59, 61, 64, 65, 66

- **Objective 17**

Seeks to manage the extent of off-site impacts or nuisance effects arising from existing activities on surrounding land use activities. Where different land uses



are located adjacent to each other there is always the potential for conflict, for Industrial activities, predominantly in relation to odour.

Section 4.3, 5.3 and 7.3 of this application outlines the mitigation measures Silver Fern Farms have in place to manage any potential odour from operations, including buffers, plantings, pipe flushing and weather station. Silver Fern Farms has also consulted with neighbours on the consent application and any issues they may have (s. 10). The majority of neighbours had no issues with the management of operations. The owners of the Oruawhoro Homestead had several concerns, which they have been working through with the Company to reach a mutually satisfactory resolution during the term of the existing consent as they have expanded their operations.

- **Objective 20**

Seeks to manage the use of organic material including that derived from animal processing plants (but does not include liquid effluent). This objective is relevant to the screened stockyard material that Silver Fern Farms spread to land. The spreading of this material to land, rather than sending it to landfill, is consistent with the non-regulatory methods of Policy 11, which encourages re-use of suitable materials.

Section 4 of this application outlines how discharges are managed, which meet the regulations for the discharge of organic material set out in Policy 12 and 14; including appropriate buffers from surface water bodies, property boundaries, bores, dwellings and nitrogen loading. Compliance has been demonstrated consistently over the term of the existing consent.

- **Objective 22**

Seeks to maintain or enhance groundwater quality in unconfined or semiconfined productive aquifers. Takapau is located within the Ruataniwha Plains, where unconfined aquifers are identified as being vulnerable to contamination. The chief sources of contamination has been attributed to agriculture and meat processing.

Policy 16 provides for the regulation of activities over the Heretaunga Plains and Ruataniwha Plains, including domestic sewage disposal, stormwater discharges and discharges to land that may enter water, which are relevant to Silver Fern



Farms application. Policy 17 sets out the overall approach for the management of all activities which may adversely affect groundwater quality. Policy 48 determines conditions on appropriate buffer zone distances and between animal effluent disposal areas and surface water bodies or property boundaries. Policy 49 provides for the diversion and discharge of stormwater.

The current consents comply with the relevant standards / conditions / terms of the rules of the RRMP. As such, Silver Fern Farms activities are managed in accordance and consistent with the policies.

- **Objective 27**

Seeks to maintain or enhance the water quality of rivers, lakes and wetlands in order that they are suitable for sustaining or improving aquatic ecosystems in catchments as a whole and for contact recreation purposes where appropriate. Again, in complying with the conditions of current resources consents and the standards / conditions / terms of the rules of the RRMP, activities are managed in accordance and consistent with policies. Silver Fern Farms are also not increasing any of the discharges, but instead maintaining / improving upon existing activities.

- **Objective 34 to 37**

Recognise the matters of significance to Iwi and Hapu. As part of seeking these consent renewals Silver Fern Farms has consulted with the Tangata whenua of the area and commissioned a Cultural Impact Assessment report (Appendix Five) from them to gain an understanding of the effects of the activity on cultural values, and to determine whether the activities are within the boundaries of cultural acceptance.

Through the consultation process, Silver Fern Farms has re-kindled and strengthened its relationship with the Tangata whenua of the area and will continue to fostering this relationship into the future.

8.3.2 Regional Plan Objectives and Policies

Chapter 5 of the RRMP contains the objectives and policies that form the framework of environmental management for the Regional Plan. Silver Fern Farms Takapau is within the Tukituki River Catchment, therefore the objectives and policies of Chapter



5.9 (Tukituki River Catchment) take precedence over Chapters 5.4 (Surface Water Quality) and 5.6 (Groundwater Quality) which do not apply in the Tukituki River Catchment. The relevant objectives and policies are listed in Table 8.3.2(a) below:

Table 8.3.2(a): Summary of RRMP Objectives and Policies		
Issues	Objective	Policies
5.2 Land	38	67
5.3 Air	39	69
5.9 Tukituki River Catchment	TT1 land use (b) & Ba) water quality, (c) periphyton, (e) mauri, (f) economic. TT2 water quality	TT1 Surface water quality TT2 Groundwater quality TT4 Nitrogen TT5 Phosphorous

- **Objective 38**

Seeks for the management of the land to avoid compromising future use and water quality, with accompanying Policy 67 outlining environmental guidelines to encourage the management of effects for activities affecting soil.

The management of wastewater application and the cut-and-carry nature of the operation assist to limit nutrient loading so that activities are consistent with land use capability. The application of wastewater and solids is likely to increase the organic content of the soil, which will enhance the biological properties. Minimal grazing and cultivation benefits soil structure as a result of less compaction.

- **Objective 39**

Seeks that a standard of ambient and local air quality is maintained at or enhanced to a level that is not detrimental to human health, amenity values of the life supporting capacity of air, and meets National Environmental Standards. Policy 69 outlines the guidelines to manage the effects of activities.

The cessation of rendering and blood drying operations onsite will have enhanced air quality through the elimination of key potential sources of odour and also by reducing the load on the boilers. Moreover, combined with the closure of Titan Meats (formerly Process Products), one boiler (950 KW) is no longer needed and has been relocated to another Silver Fern Farms operation.



Boilers are run on gas with a back up supply of diesel. These are relatively clean fuels and given their location within the site, effects from the emissions are unlikely to be evident beyond the property boundary.

Discharges to land (wastewater and stockyard solids) are managed so as to minimise the potential for odour to occur beyond the boundary. In the event that an incident occurs or a complaint made, it is standard practise to investigate and address any issues promptly.

- **Objective TT1 and TT2**

Seeks to sustainably manage the use and development of land, the discharge of contaminants including nutrients, and the taking, using, damming, or diverting of fresh water in the Tukituki River catchment. The associated policies relevant to Silver Fern Farms activities are TT4 and TT5 (Implementing Nitrogen and Phosphorous Limits and Targets).

In regards to the rules for land use in the Tukituki Catchment, footnote 17 states that:

“POL T4(1)(g) does not apply to discharges of industrial and trade wastewater to land. Those activities are managed under POLs 16 and 17 and Rules 49 and 52 of the RRMP.”

Therefore, Silver Fern Farms would conclude that the discharge activities will not be subject to a land use consent under the Tukituki River Catchment Rules.

Whilst Silver Fern Farms activities are by definition those of an industrial trade premise rather than a traditional farming activity, there are parallels in the management of land and nutrients to minimise any actual or potential effects on the receiving environment. As such, Silver Fern Farms has addressed those parts of the policies relevant to operations.

Silver Fern Farms has an ILMP (Appendix Three) which provides guidance to the systems and controls for the effective management of the land-based wastewater irrigation and other relevant associated land based activities. The Plan incorporates the requirements of Schedule XXI and Schedule XXII. Appendix Eight provides a matrix of the ILMP against the relevant parts of Schedules and Policies.



Table 8.3.2(b) and (c) below provides commentary on how Silver Fern Farms has addressed, and how the management of our activities are consistent with the various aspects of Policies TT4 and TT5.

Table 8.3.2(b): RRMP Compliance with POL TT4		
No.	Policy	Silver Fern Farms Comments
1	To ensure that the Table 5.9.1B nitrate nitrogen and dissolved inorganic nitrogen surface water quality limits and the Table 5.9.1D Tukituki LUC Natural Capital Leaching Rates are not exceeded on a whole of farm property or whole of farming enterprise basis:	
1(a)	From 1 June 2013 onwards farm properties or farming enterprises exceeding 4 hectares in area shall be required to either: (i) Keep the records specified in Schedule XXI so that Nutrient Budgets can be calculated using OVERSEER (or an alternative model approved by Hawke's Bay Regional Council) prior to 31 May 2018; or (ii) Keep copies of Nutrient Budget input and output files that have been prepared in accordance with an industry programme approved by Hawke's Bay Regional Council;	Current consent conditions require monitoring and recording of irrigation, volumes, loadings and nutrient take off through cut and carry. A simplified Nutrient balance is provided to HBRC as part of the annual monitoring report. For the purposes of this consent renewal the monitoring data has been run through OVERSEER. Whilst OVERSEER does factor in cut-and-carry, it is not entirely adequate to model the wastewater irrigation activities of meat processing operation. OVERSEER also recommends that wastewater is added into the model as fertiliser. While not perfect, it is the best and most accepted nutrient modelling tool available to use.
1(b)	By 1 June 2018 farm properties or farming enterprises exceeding 4 hectares in area shall prepare and maintain a Farm Environmental Management Plan prepared in accordance with Schedule XXII. The Farm Environmental Management Plan (FEMP) should be in proportion to the complexity or intensity of the particular farming operation. The FEMP shall be updated at three yearly intervals from 1 June 2018. Except that for low intensity farming systems the property size threshold shall be 10 hectares. This exception is to recognise that low intensity farming systems have low nitrogen losses. The farming systems included in this category may be further developed and included in the Regional Resource Management Plan via a plan change prior 31 May 2018.	Silver Fern Farms has an ILMP that incorporates the relevant aspects of Schedule XXII. This is included as Appendix Three. Appendix Eight provides a matrix of the ILMP against the relevant parts of Schedules and Policies.
1(c)	Require industry good practices to be implemented on farm properties or farming enterprises in order to minimise nitrogen losses.	The ILMP outlines guidance to the systems and controls for the effective management of the land-based wastewater irrigation.
1(d)	Until 31 May 2018 the managers of farm properties and farming enterprises shall be required to measure or model nitrogen leaching rates to support the	Current consent conditions require monitoring and recording of irrigation, volumes, loadings and nutrient take off through cut



	<p>preparation of Nutrient Budgets to be included in a Farm Environmental Management Plan.</p> <p>The Nutrient Budgets must be updated thereafter at least 3 yearly. The initial Nutrient Budget must be provided to Hawke's Bay Regional Council while the three yearly updates need only be provided to the Council upon written request.</p>	<p>and carry. A simplified Nutrient balance is provided to HBRC as part of the annual monitoring report. For the purposes of this consent renewal the monitoring data has also been run through OVERSEER.</p> <p>Whilst OVERSEER does factor in cut-and-carry, it is not entirely adequate to model the wastewater irrigation activities of meat processing operation. OVERSEER also recommends that wastewater is added into the model as fertiliser. While not perfect, it is the best and most accepted nutrient modelling tool available to use</p>
1(e)	<p>Require that the records kept in accordance with POL TT4(1)(a), (b) and (d) are to be reviewed annually in accordance with an industry programme approved by Hawke's Bay Regional Council (or in the absence of an industry programme, as directed by Hawke's Bay Regional Council) to assess whether any farm system changes are evident in the previous 12 months. If such a change is evident, the Nutrient Budget for the farm system must be updated to determine whether the nitrogen leached from the land exceeds the relevant limit in Table 5.9.1D on a whole of farm property or whole of farming enterprise basis and the updated Nutrient Budget must be provided to the Hawkes Bay Regional Council.</p>	<p>Current consent conditions require a simplified nutrient balance to be provided to council as part of the annual consent monitoring report along with a review of performance and management with recommendations for improvements if required.</p>
1(f)	<p>Allow until 31 May 2020 farm properties or farming enterprises to implement any necessary changes to their farming systems to achieve the Table 5.9.1D Tukituki LUC Natural Capital Nitrogen Leaching Rates on a whole of farm property or whole of farming enterprise basis.</p>	<p>Silver Fern Farms discharge activities require a resource consent. For the purposes of this consent renewal an OVERSEER Nutrient Budget was prepared which gave an average Nitrogen leaching rate for the combined activities of the land holding of 17kgN/ha/yr.</p> <p>The Silver Fern Farms property is a mixture of LUC Class III, IV and VI, the modelled leaching rate is considered reasonable in comparison to the surrounding land use of the wider area.</p> <p>The rate is also consistent with the thresholds for LUC of the land holding, with the average LUC leaching rate for the land holding being 22.7kgN/Ha/Yr.</p>
1(g)	<p>Require the use of production land on properties greater than 4 hectares in area in those Tukituki River sub-catchments where there are exceedances of Table 5.9.1B (surface water) or Table 5.9.2 (groundwater) nitrate-nitrogen or dissolved inorganic nitrogen limits and targets to be subject to a land use consent under Rule TT2 or Rule TT2A if the targets are still exceeded or become exceeded after 1 June 2020 unless the farm property or farming enterprise is</p>	<p>Foot note 17 states that: <i>"POL T4(1)(g) does not apply to discharges of industrial and trade wastewater to land. Those activities are managed under POLs 16 and 17 and Rules 49 and 52 of the RRMP."</i></p>



	a low intensity farming system or solely comprises plantation forestry;	
1(h)	<p>By 31 May 2018, HBRC will develop a Procedural Guideline in collaboration with primary sector representatives to aid in the implementation of POL TT4. The Guideline will include, but not be limited to:</p> <ul style="list-style-type: none"> -the methodology for estimating a Nutrient Budget using OVERSEER (or an alternative model approved by Hawke's Bay Regional Council), -the process for monitoring water quality trends and alerting affected farming properties if water quality limits are being approached; -delineation of the 'capture zone' for the relevant water body (the area of groundwater or surface water contributing to the particular part of the water body in question); and, -where Rule TT2 is triggered, an adaptive management process for reducing nitrogen leaching from affected farming properties based on the implementation of progressively more stringent on farm management practices. 	Silver Fern Farms is open to working with the Regional Council to aid in the implementation of the policy as relevant to activities carried out at Silver Fern Farms Takapau.
1(i)	After 1 June 2020 manage activities with leaching rates that exceed those specified in Table 5.9.1.D through a resource consent process under Rule TT2 where such exceedance is 30% or less or Rule TT2A where leaching rates in Table 5.9.1D are exceeded by more than 30%.	<p>This condition is not applicable until after 1 June 2020.</p> <p>Silver Fern Farms discharges, as they are from an Industrial trade premise, are currently consented and managed under Rule 52.</p> <p>Leaching rates as calculated using the OVERSEER Model for the combined activities of the land holding were 17KgN/Ha/Yr, well within the LUC leaching rates of Table 5.9.1D.</p> <p>Should any additional monitoring or management measures be required in respect to the activities of Silver Fern Farms, as a discretionary activity it should be possible to incorporate these into the replacement consent rather than a duplicate with essentially the same intent.</p>
1(j)	For the purposes of achieving compliance with Table 5.9.1D, the estimated leaching rate shall be a 4 year rolling average of the estimated nitrogen leaching rates derived from Nutrients Budgets prepared after 1 June 2013.	Silver Fern Farms currently reviews and reports data to HBRC on an annual basis.
2	To assist with monitoring the effectiveness of POL TT4(1) the Hawke's Bay Regional Council will:	
2(a)	Monitor instream water quality at existing State of the Environment monitoring sites to assess compliance with Table 5.9.1B dissolved inorganic nitrogen (DIN) and nitrate-nitrogen limits and targets; and	Whilst a Regional Council action, Silver Fern Farms carries out both surface and groundwater monitoring as part of its current consent monitoring conditions in order to assess the actual effects of activities on the receiving environment. This monitoring data is provided to the HBRC.
2(b)	Incorporate that information in its regular state of the environment reporting and report on it annually.	Regional Council action.



Table 8.3.2(c): RRMP Compliance with POL TT5		
No.	Policy	Silver Fern Farms Comments
1.	To ensure that the Table 5.9.1B dissolved reactive phosphorus (DRP) surface water quality limits are not exceeded and to attain the Table 5.9.1B DRP targets ¹⁹ by 1 July 2030 Hawke's Bay Regional Council will:	
1(a)	<p>From 1 June 2018 onwards, require farm properties or farming enterprises exceeding 4 hectares in area to prepare and maintain a Phosphorus Management Plan as part of a Farm Environmental Management Plan prepared in accordance with Schedule XXII.</p> <p>Except that for low intensity farming systems the property size threshold shall be 10 hectares. This exception is to recognise that low intensity farming systems have low phosphorus losses. The farming systems included in this category may be further developed and included in the Regional Resource Management Plan via a plan change prior 31 May 2018.</p>	Silver Fern Farms has an ILMP that incorporates the relevant aspects of Schedule XXII. This is included as Appendix Three. Appendix Eight provides a matrix of the ILMP against the relevant parts of Schedules and Policies
1(b)	<p>In areas where the Table 5.9.1B DRP targets are exceeded:</p> <p>(i) Ensure existing point source discharges do not contribute any additional phosphorus load to the Tukituki River or its tributaries and through consent review and renewal processes seek to reduce existing loads where necessary to progress towards phasing out the exceedance;</p> <p>(ii) Ensure any new point source discharges will not increase existing DRP concentrations in the Tukituki River or its tributaries after reasonable mixing;</p>	For point source discharges - not applicable
1(c)	(c) In areas where the Table 5.9.1B DRP limits are not exceeded, ensure that any new point source discharges will not cause those limits to be exceeded in the Tukituki River or its tributaries after reasonable mixing;	For point source discharges - not applicable
1(d)	<p>Require any application for a resource consent for the use of production land on farm properties or farming enterprises to demonstrate:</p> <p>(i) In areas where the Table 5.9.1B DRP limits are not exceeded that the proposed activity will not lead to an exceedance of the limits in the Tukituki River or its tributaries;</p> <p>(ii) In areas where the Table 5.9.1B DRP targets are exceeded that the proposed activity will not increase existing DRP concentrations in the Tukituki River or its tributaries and that all reasonable and practicable opportunities have been taken to reduce²¹ phosphorus losses from the farm property;</p> <p>(iii) The likely achievement of (i) and (ii) through the preparation of a Phosphorus Management Plan.</p>	Silver Fern Farms ILMP (Appendix Three) outlines how Phosphorous is managed. The current consent monitors Phosphorous levels in the Porangahau Stream adjoining Silver Fern Farms land disposal areas.
1(e)	<p>Recognise that significant parts of the Tukituki River catchment are generally in a state of over-allocation with respect to instream DRP limits and therefore through the implementation of land use rules:</p> <p>(i) On land that is less than 15 degrees in slope, require livestock (other than sheep) to be excluded from lakes, wetlands and flowing rivers (whether they are intermittent or permanent) and their margins by 31 May 2020;</p>	<p>Stock exclusion is managed through the ILMP (s. 8.3.1).</p> <p>Stock are fenced out of the Porangahau Stream and crossing of the stream occurs at the bridge on Fraser Road.</p> <p>Majority of this policy does not apply as the general slope of land</p>



	<p>(ii) On land that is greater than 15 degrees in slope and where the stocking rate of livestock excluding sheep exceeds 18 stock units per hectare, either:</p> <p>(1). require livestock (other than sheep) to be excluded from lakes, wetlands and flowing rivers (whether they are intermittent or permanent) and their margins by 31 May 2020; or</p> <p>(2). other than the Papanui, Porangahau, Maharakeke, Tukipo, Kahahakuri and upper Tukituki corridor catchments shown in Schedule XIVc, if livestock exclusion is not reasonably practicable a Phosphorus Management Plan prepared as part of the Farm Environmental Management Plan that includes all reasonably practical stock exclusion requirements and other mitigation of phosphorus loss must be prepared and provided to the Hawkes Bay Regional Council by 31 May 2018 and thereafter be implemented by 31 May 2020.</p> <p>(iii) Within the Papanui, Porangahau, Maharakeke, Tukipo, Kahahakuri and upper Tukituki corridor catchments (as shown in Schedule XIVc POL TT5(1)(e)(ii)(1) must be complied with.</p> <p>(iv) Require formed stock races crossing rivers and streams (excluding managed stock crossings) to be bridged or culverted by 31 May 2020;</p>	<p>at Silver Fern Farms Takapau is classed as 0-15 degrees.</p>
1(f)	<p>Provide land advisory services and incentives, in collaboration with the primary industry sector and the community, prioritising efforts on tributary catchments which significantly exceed the DRP targets. In particular Hawke's Bay Regional Council will:</p> <p>(i) Develop a catchment strategy and implementation plan to identify critical source areas for phosphorus and eliminate or reduce phosphorus losses;</p> <p>(ii) Encourage industry good practices to be implemented on farm properties or farming enterprises in order to reduce phosphorus losses;</p> <p>(iii) Encourage riparian planting in conjunction with permanent stock exclusion fencing;</p> <p>(iv) In the Water Management Zone 5 (Papanui), encourage riparian planting which provides shading for rivers and streams in order to reduce macrophyte growth and improve life-supporting capacity of the stream;</p> <p>(v) Encourage surface runoff from stock races, stockyards, bridges and culverts to be diverted away from rivers and streams and discharged to land.</p>	<p>Whilst a Regional Council action, Silver Fern Farms through its ILMP have implemented good practice relevant to its activities in relation to phosphorous loss. This includes riparian planting, stock exclusion fencing and providing buffer zones between activities and surface water bodies to mitigate for the potential of runoff.</p>
2	<p>To assist with monitoring the effectiveness of POL TT5(1) the Hawke's Bay Regional Council will:</p> <p>(a) Monitor instream water quality at existing State of the Environment monitoring sites to assess compliance with the Table 5.9.1B DRP limits and targets; and</p> <p>(b) Incorporate that information in its regular state of the environment reporting;</p> <p>(c) In 2025, review the need for an increased regulatory approach taking into account whether:</p> <p>(i) Instream DRP concentration trends indicate that the Table 5.9.1B DRP targets are likely to be met;</p> <p>(ii) Monitoring indicates that the Table 5.9.1B periphyton limit and targets are likely to be met; and</p> <p>(iii) The indicators set out in the Monitoring, Evaluation, Reporting and Improvement Plan are being met.</p>	<p>Whilst a Regional Council action, Silver Fern Farms currently monitors instream values as part of its existing resource consent. Data is reported monthly and annually to the HBRC.</p>



8.3.3 Regional Plan Rules

Chapter 6 of the RRMP contains the rules which allow and regulate resource activities in the Hawke's Bay Region.

- **Discharge of stockyard solids to land**

Rule 13 - Use of compost, biosolids & other soil conditioners

The discharge of contaminants into air, or onto or into land, arising from the storage, transfer, treatment, mixing or use of compost, biosolids and other (solid or liquid) organic material for soil conditioning purposes including stockyard scrapings is a **permitted activity** provided the following conditions are met:

Table 8.3.3(a): RRMP Compliance with Rule 13		
No.	Condition / Standard / Term	Silver Fern Farms Compliance
a	Any area in the Heretaunga Plains unconfined aquifer (Schedule Va) or the Ruataniwha Plains unconfined aquifer (Schedule IV) which is used for storing organic material and when there is a potential for contamination of ground water by seepage of contaminants, shall be managed in a manner that prevents such contamination.	Stockyard solids are stored in the muck spreaders which are parked on a sealed surface prior to discharge to land. Any potential seepage is contained within the wastewater drainage network.
b	Any discharges to air shall not cause any offensive or objectionable odour, or noxious or dangerous levels of gases, beyond the boundary of the subject property.	The discharge of stockyard solid waste material has been occurring at the site for a number of years without issue and this is not expected to change. The Council has not received any complaints about offensive and objectionable odour arising from the Company's discharge of waste solids.
c	There shall be no visible discharge of any material, including dust, beyond the boundary of the subject property, unless written approval is obtained from the affected property owner.	The discharge of stockyard solid waste material has been occurring at the site for a number of years without issue and this is not expected to change. The Council has not received any complaints about particulate material including dust, arising from the Company's discharge of waste solids.
d	The discharge shall not result in any airborne liquid contaminant being carried beyond the boundary of the subject property.	The discharge of stockyard solid waste material has been occurring at the site for a number of years without issue and this is not expected to change. The Council has not received any complaints about airborne liquid contaminants



		arising from the Company's discharge of waste solids.
e	There shall be no surface ponding in the area used to store, mix or use the organic material, and no runoff of contaminants into any surface water body.	Storage is undertaken on a hard surface and potential seepage is contained within the onsite wastewater drainage network.
f	There shall be no discharge within 30 m of any bore or well.	There is no discharge of stockyard solids within: <ul style="list-style-type: none"> • 20 metres of any surface water body; • 30 metres from any bore drawing groundwater from an unconfined aquifer for potable supply; • 50 metres of any surface water body during heavy rainfall; • 10 metres of any property boundary; • 50 metres of the Porangahau Stream.
g	The discharge shall occur no less than 600 mm above the winter ground water table.	There is not expected to be any discharge when the winter ground water table is less than 600 mm. Ground moisture metres (Aqualflex) are placed around the Silver Fern Farms Takapau site to monitor moisture levels of land-based wastewater discharge activities, these would provide a quick assessment of the winter ground moisture levels.
h	Where material is discharged onto grazed pasture, the application rate shall not exceed 150 kg/ha/y of nitrogen.	The Company has confirmed that no more than 150 kg/ha/yr of nitrogen from the waste solids shall be discharged onto grazed pasture. This will be monitored from within their systems. The average combined loading for the past five years has been approximately 67KgN/ha/yr.
i	Where material is discharged onto land used for a crop, the application rate shall not exceed the rate of nitrogen uptake by the crop.	The Company have confirmed that the application rate will be 150 kg N/ha/yr. The average combined loading for the past five years has been approximately 67KgN/ha/yr.

- **Discharge of contaminants to air from gas fired boilers**

Under normal operating conditions, using natural gas, the boiler discharge would be classed as controlled under Rule 18 as the combined maximum heat output of 8.4 MW is well under the threshold of 50 MW. However, to provide for the emergency back-up option, to be powered by diesel, the



combined maximum heat output of the three boilers (8.4 MW) exceeds the stated 5 MW threshold. Therefore, the activity falls under Rule 30 as a **restricted discretionary** activity.

Rule 30: *“Discharges of contaminants to air not regulated by, or that cannot comply with, Rules 11-19e, 20a -29. The discharge of contaminants into the air that ... do not comply with all relevant standards and terms on a controlled activity rule or restricted discretionary activity rule...”*

Given that the nature of non-compliance with Rule 18 is for an emergency back-up, the related environmental effects would be minimal and temporary in nature.

Table 8.3.3(b) below outlines the compliance with Rule 18, other than the emergency backup diesel combined maximum heat output:

No.	Condition / Standard / Term	Silver Fern Farms Activity
a	The maximum heat output shall not exceed:	
	i. 50 MW for natural or liquefied petroleum gas, or	Combined output of the three boilers is 8.4 MW.
	ii. 600 KW for wood pellet fuel in a modified pellet boiler	N/A - wood pellets not used.
	iii. 1.2 MW for wood pellet fuel in a custom designed pellet boiler	N/A wood pellets not used.
	iv. 5 MW for diesel (external combustion).	Combined output of three boilers is 8.4 MW.
	v. Where more than one fuel type is used on the site the combined heat output shall not exceed the lowest MW threshold of the fuel types used.	Primary fuel is natural gas, emergency back up is diesel. Combined maximum heat output complies with Natural gas but exceeds maximum heat output for diesel.
b	The fuel shall not comprise any of the waste materials specified in the activity description of Rule 20.	Only natural gas or diesel are used as fuel for the boilers. None of the materials listed in Rule 20 are used as fuel combusted in the boilers.
c	At any point beyond the boundary of the subject property, or on public land:	
	i. The discharge shall not result in any objectionable deposition of particulate matter on any land or structure;	Given the fuel type deposition of particulate matter is unlikely.
	ii. The discharge shall not result in any offensive or objectionable odour, or any noxious or dangerous levels of gases;	Previous modelling demonstrated levels would be below ambient guidelines.
	iii. The discharge shall not result in any smoke that adversely affects traffic	Given the fuel type and location of the boilers on the site, traffic safety or issues with visibility are unlikely.



	safety or reduces visibility within a height of 5 metres above ground level.	
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As the application is for a restricted discretionary activity, only the matters over which HBRC's discretion has been restricted have been assessed.

Those matters are detailed in Table 8.3.3(c) below:

Table 8.3.3(c): RRMP Compliance with Rule 30		
No.	Matters for Control / Discretion	Silver Fern Farms Activity / Comments
a.	The conditions, standards or terms which the activity cannot comply with, and related environmental effects.	Under normal operating conditions, using natural gas, the combined output of 8.4 MW is well within the 50 MW threshold of condition (a)(i). However, providing for the ability to use diesel as an emergency backup fuel the combined output of 8.4 MW exceeds the 5 MW threshold for diesel stipulated in condition (a)(iv). The boilers are run with diesel once a month for half an hour to ensure the back up system is functioning. Diesel has not needed to be used for any length of time in the past 10 years.
b.	For activities that would otherwise be permitted or controlled activities (if they complied with all standards and terms of the relevant rule), the conditions/standards/terms or "matters for control" set out in the relevant rule.	The activity complies with the remaining conditions (b) None of the materials listed in Rule 20 are used as fuel / combusted in the boilers. (c)(i) Given the fuel type objectionable deposition of particulate matter is unlikely. (c)(ii) Combustion of natural gas does generally not result in the discharge of objectionable odour. Previous modelling demonstrated gas levels would be below ambient guidelines. (c)(iii) Given the fuel type and location of the boilers on the site, traffic safety or issues with visibility are unlikely.
c.	Duration of consent.	A term of 10 years has been applied for
d.	Lapsing of consent.	The consent is currently being fully exercised and will continue to be so after this replacement application is granted. Accordingly a lapse date is not as relevant in this instance, however a five year lapse may be appropriate.
e.	Review of consent conditions.	Review conditions are supported by Silver Fern Farms.
f.	Compliance monitoring.	See s. 7
g.	Contaminant emission limits.	
h.	Any measures necessary to: ensure maintenance of fuel burning equipment, the carrying out of measurements, samples, analysis, surveys, investigations or inspections including the monitoring of: contaminant concentrations and emission rates, the opacity of the discharge, quantity of fuel used, the cumulative effects of the discharge in combination with discharges from	See s. 7



	other sources, and the provision of information to the consent authority at specified times.	
i.	Administrative charges.	
j.	Effects on flight paths and the roading network.	Given the fuel type and location of the boilers on the site, effects on flight paths and the roading network are unlikely.
k.	New technologies available to minimise any discharges or their effects.	Silver Fern Farms has an ethic of continuous improvement and will investigate and implement new technologies where appropriate.
l.	Methods used to disperse contaminants, including chimney height, chimney design and emission velocity. Chimney height will be determined generally in accordance with Schedule IX.	The stack height of all three boilers is greater than 13 metres, which complies with the requirements for natural gas and diesel.

- **Discharge to air from irrigation of wastewater**

The discharge of contaminants into air from any industrial or trade premises caused by waste disposal is not specifically regulated by any rule within the plan. Therefore is classified as a **discretionary activity** under rule 28 Miscellaneous industrial trade premises.

- **Discharge contaminants to air from general meat processing activities**

In addition to specific discharges to air i.e. the boilers, the site also has a number of smaller emissions from ventilation, air conditioning and cooling systems.

These discharges, as described in s.7, would fall under Rule 29 (The discharge of contaminants in to air from any industrial or trade premise that is not specifically regulated by any other rule within the plan) as a **permitted activity**.

Table 8.3.3(d) below demonstrates compliance with the conditions of Rule 29:

Table 8.3.3(d): RRMP Compliance with Rule 29		
No.	Condition / Standard / Term	Silver Fern Farms Activity
a.	The opacity of any discharge of smoke when measured at the point of discharge shall not exceed 20%, except that a discharge in excess of this shall be permitted for a period of not more than two minutes continuously or for an aggregate of four minutes in any 60 minute period.	The Silver Fern Farms discharge activities relevant to this rule are water vapour and heated air and do not include any smoke.
b.	The discharge shall not result in any airborne liquid contaminant excluding	Discharges are low velocity and given the location of the buildings and distance from the boundary



	water vapour being carried beyond the boundary of the subject property.	of the property it is unlikely there would be any effect observed beyond the boundary.
c.	The discharge shall be located and designed to avoid cross contamination of air intake used for ventilation purposes.	Discharges and intakes are designed and situated as to minimise cross contamination.
d.	At any point beyond the boundary of the subject property, or on public land;	
	i. The discharge shall not result in any noxious or dangerous levels of airborne contaminants;	The discharges are ventilation from processing areas, primarily water vapour and hot air, so as not to contain any noxious or dangerous contaminants
	ii. There shall be no visible discharge of any contaminant, other than smoke from fuel burning equipment or water vapour;	Activities relating to this rule do not include any fuel burning equipment.
	iii. Any discharge of water vapour shall not result in any plume which adversely affects traffic safety, or reduces visibility within a height of 5 metres above ground level, or reduces visibility within recognised flight paths in the vicinity of airports;	The scale and location of discharges is unlikely to result in plumes that will adversely affect traffic safety or flight paths.
	iv. The discharge shall not result in any offensive or objectionable odour;	Discharges may have a slight odour reminiscent of a butchers shop or stockyards. Odours would be consistent with the amenity / character of the rural zone and not offensive or objectionable.
	v. The dust deposition rate resulting from the discharge shall not raise the ambient dust deposition rate by more than 4g/m ² per 30 days;	The discharges are primarily water vapour and hot air and are unlikely to contain any significant particulate matter.
	vi. The discharge shall not result in any objectionable deposition of particulate	The discharges are primarily water vapour and hot air and are unlikely to contain any significant particulate matter.
e.	At any point within or beyond the subject property, the discharge shall not result in any objectionable deposition of particulate matter on National Electricity Transmission Network lines.	The discharges are primarily water vapour and hot air and are unlikely to contain any significant particulate matter.

- **Discharge of treated domestic wastewater**

The site has historically treated domestic waste through an oxidation pond before discharging the treated wastewater to land via border-dyke irrigation. Rules 35 and 36 cover these activities. Given that the rate of discharge exceeds the permitted activity status threshold of 2 m³/d, averaged over any 7-day period of Rule 35, the activity is classified as **Restricted Discretionary** under Rule 36.

Table 8.3.3(e) below demonstrates compliance with the conditions of Rule 36 (The discharge of contaminants onto or into land, and any ancillary discharge of



contaminants into air, from any existing sewage system with a discharge volume exceeding 2m³/day averaged over any 7-day period).

Table 8.3.3(e): RRMP Compliance with Rule 36		
No.	Condition / Standard / Term	Silver Fern Farms Activity
a.	The discharge shall not occur over the Heretaunga Plains or Ruataniwha Plains unconfined aquifer as shown in Schedule IV.	The discharge location at Takapau is not within / over the Heretaunga Plains or Ruataniwha Plains unconfined aquifer as shown in Schedule IV of the RRMP.
b.	There shall be no surface ponding as a result of the discharge, or direct discharge into any water body.	There have been some instances of ponding over the term of the existing consent however in some instances this has been rain water after significant rain events. During the term of the existing consent borders and dykes have undergone re-development including raising the exterior boundary, internal borders and re-levelling the gradient of the dykes to improve flow.
c.	There shall be no increase in the concentration of pathogenic organisms in any surface water body as a result of the discharge.	Impacts from this system and the other discharges on the Porangahau Stream are not evident in the regular consent monitoring undertaken.
d.	Either: i. The point of discharge shall be no less than 600 mm above the highest seasonal groundwater table; or ii. The discharge shall not result in, or contribute to, a breach of the "Drinking Water Quality Standards for New Zealand" (Ministry of Health, 2005 (Revised 2008)) in any groundwater body after reasonable mixing.	The shallowest groundwater is generally encountered at or below 5m below ground level.
e.	The discharge shall not cause any emission of offensive or objectionable odour, or release of noxious or dangerous gases (including aerosols) beyond the boundary of the subject property.	Appropriately managed oxidation ponds do not create offensive odour. There may be a slight musty odour associated with the ponds but this odour is generally not noticeable at distances greater than 20-30 m away. Border dyke irrigation results in minimal, if any aerosol. The land treatment area is bounded by rural farmland to the west, wastewater irrigation block to the south, grazing land to the east and the Porangahau Stream to the north, with the nearest house approximately 750m to the north-west. It is unlikely any odour generated would be detected beyond the boundary of the property.

As the application is for a restricted discretionary activity, only the matters over which HBRC's discretion has been restricted have been assessed. Those matters are detailed in Table 8.3.3(f) below:



Table 8.3.3(f): RRMP Rule 36 Compliance with Matters to which Discretion is Restricted.		
No.	Matters	Silver Fern Farms Activity
a.	Method of treatment.	Domestic wastewater is treated in an oxidation / facultative pond.
b.	Method of disposal.	Treated wastewater from the oxidation pond is discharged to 1.6 Ha border dyke irrigation system adjacent to the oxidation pond.
c.	Effluent application rate	$\leq 750\text{m}^3$ over 8,000m ² every 21 days ~ 50 mm per application
d.	Need for reserve area	The treatment area is bunded and located approximately 39 metres from the Porangahau Stream at the closest point.
e.	Buffer zone requirements	Buffer zones have been established to avoid direct or surface run-off to the Porangahau Stream.
f.	Duration of consent.	A term of 10 years has been applied for.
g.	Review of consent conditions.	Review conditions are supported.
h.	Compliance monitoring	The current monitoring regime is outlined in section 5.
i.	Proximity to registered drinking water supplies	The Central Hawke's Bay District Council's Takapau Township bore is located up gradient of the discharge site and the Waipukurau Township Water supply is approximately 9km from the site.
j.	Maintenance of system	See section 5.

- **Discharge to land of stormwater**

Rules 42 and 43 deal with the diversion and discharge of stormwater. Permitted Rule 42 does not include stormwater from any industrial trade premises, therefore Silver Fern Farms activities come under Rule 43: Diversion and discharge of stormwater as a ***controlled activity***.

Table 8.3.3(g) below outlines and provides information on the adherence of Silver Fern Farms activities with the relevant conditions, standards terms and matters for discretion.

Table 8.3.3(g): RRMP Compliance with Rule 43		
No.	Condition / Standard / Term	Silver Fern Farms Activity
a.	All reasonable measures shall be taken to ensure that the discharge is unlikely to give rise to all or any of the following effects in any receiving water after reasonable mixing:	



	i. The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials.	There is rarely any discharge from the pond and, if there was, the pond has a high retention time. Any stormwater overflow from the pond is further treated via the 450-metre watercourse to the Porangahau stream.
	ii. Any conspicuous change in the colour or visual clarity.	Given the clean nature of the influent sources to the stormwater pond, the high retention time, rarity of discharge events and further treatment on its way to the Porangahau stream there is unlikely to be any change in colour or visual clarity.
	iii. Any emission of objectionable odour.	The stormwater ponds has no aerators and there is no odour, therefore air quality is not an issue.
	iv. The rendering of fresh water unsuitable for consumption by farm animals.	Given the clean nature of the influent sources to the stormwater pond, the high retention time, rarity of discharge events and further treatment on its way to the Porangahau stream the effects on fresh water will be negligible.
	v. Any significant adverse effects on aquatic life.	Given the clean nature of the influent sources to the stormwater pond, the high retention time, rarity of discharge events and further treatment on its way to the Porangahau stream the effects on surface water will be negligible.

Table 8.3.3(h) below details the matters to which discretion is restricted:

Table 8.3.3(h): RRMP Rule 43 Compliance with Matters to which Discretion is Restricted.		
No.	Matters	Silver Fern Farms Activity
a.	Location of the point of diversion and discharge including its catchment area.	Section 6 of this application details the location of the pond, discharge route and discharge point.
b.	Volume, rate, timing and duration of the discharge, in relation to a specified design rainfall event	Given the management of the stormwater pond and re-use of the water, discharge events are rare. Historical events that have resulted in a discharge have not resulted in a significant flooding of the grass watercourse downstream of the pond.
c.	Effects of the activity on downstream flooding.	Given the large retention time, rarity of discharge and distance to discharge point, effects on downstream flooding will be negligible.
d.	Contingency measures in the event of pipe capacity exceedance.	None.
e.	Actual or likely adverse effects on fisheries, wildlife habitat or amenity values of any surface water body.	Given the clean nature of the influent sources to the stormwater pond, the high retention time, rarity of discharge events and further treatment on its way to the Porangahau stream the effects on surface water will be negligible.
f.	Actual or likely adverse effects on the potability of any ground water.	There is no groundwater use from the shallow aquifer within 2.5 kilometres down gradient of this site. The groundwater is not sensitive to the occasional overflow of settled stormwater and hence effects from the overflow are considered to be less than minor.
g.	Duration of the consent	A 10-year consent is being applied for.
h.	A compliance monitoring programme	None.



- **Discharge to land of wastewater and stockyard solids**

Rule 52: The discharge of contaminants onto or into land which does not comply with any condition on a permitted activity rule, or any standard or term on a controlled activity rule within this Plan, but which is not expressly classified as a discretionary, non-complying or prohibited activity is a discretionary activity. The discharges of wastewater and stockyard solids to land would be **discretionary activities** under this rule.

8.4 Statutory Summary

Table 8.4 below summarises the activities subject to this consent renewal, the associated rules and corresponding activity status.

Table 8.4: Summary of Activities / Rules and Classifications		
Activity	Rule	Activity Classification
Discharge of stockyards to land	13	Permitted
Discharge of contaminants to air from boiler activities	30	Restricted Discretionary
Discharge of contaminants to air from the land application of wastewater and stockyard solids	28	Discretionary
Discharge of contaminants to air from general meat processing activities	29	Permitted
Discharges to land and ancillary discharges to air of secondary treated domestic wastewater	36	Restricted Discretionary
Discharge of stormwater to land where it may enter water	43	Controlled
Discharge of treated wastewater to land	52	Discretionary



9 CONSIDERATION OF ALTERNATIVES

9.1 Overview

Under Schedule 4, Clause 6(1)(a) of the Resource Management Act (RMA), alternative options need to only be considered if the proposed activity results in significant adverse environmental effects. Additionally, Clause 6(1)(d)(ii) of Schedule 4 also requires an assessment of alternatives where the activity involves a discharge of a contaminant. Existing activities have not and will not result in adverse effects, but do involve discharges. It is therefore appropriate, and in line with the Company's ethic of continuous improvement, to consider potential alternatives.

9.2 Discharge of Wastewater

The alternative options considered for the disposal of wastewater include:

- Discharge to the Porangahau Stream;
- Alternative irrigation methods; and
- Further wastewater treatment.

9.2.1 Discharge to the Porangahau Stream

Land based wastewater disposal is generally always preferable over a point source discharge to water. The Porangahau Stream is an acknowledged area of significance for Tangata whenua as an area of special cultural, spiritual, historical and traditional association. For these reasons, Silver Fern Farms see no value in progressing with this option. In addition, Silver Fern Farms preference, and most environmental sound option, is the current method of spray irrigation to land.

9.2.2 Alternative Irrigation Methods

Silver Fern Farms use a variety of different land-based irrigation methods across the country. Alternative irrigation methods such as linear / lateral or centre-pivot travelling irrigations have been considered for use at *the Operating Site*. However, given the uncertainty surrounding the Ruataniwha Water Storage Scheme and any potential for supplementary water, Silver Fern Farms are hesitant to alter the current system until a decision is made on water availability.



9.2.3 Further Wastewater Treatment

9.2.3.1 Chemically treated DAF

The use of chemically assisted DAF treatment can assist in reducing proteins as well as solids and organic load within the waste stream. The disadvantage of this system is the high operational costs associated with chemical flocculating aids or coagulants. Furthermore, the use of these agents results in increased sludge and subsequent disposal costs.

Providing monitoring results (groundwater and soil analysis) continue to demonstrate no adverse effects from the current level of wastewater treatment, Silver Fern Farms see no benefit in chemically treating the DAF and prefer to utilise the nutrients available for cut and carry operation.

9.2.3.2 Pond Systems

The use of anaerobic and aerobic ponds for biological treatment has been considered. Anaerobic ponds provide simple, robust and cost effective removal of solids and organic matter while aerobic ponds are efficient in removing organic contaminants.

However, there are a number of disadvantages to these pond systems:

- Aerobic ponds requires aeration which uses a large amount of electrical energy;
- Both ponds have the potential to discharge odorous emissions to air; and
- Both ponds generate large amounts of bio-solids which have associated desludging and disposal costs.

As Silver Fern Farms would need to construct the required infrastructure, given that current wastewater treatment is considered adequate with minimal effects, the capital expenditure outweighs any benefit for environmental improvement.

9.2.4 Summary of Alternatives

Whilst other alternatives are possible, these are considered either impractical or not viable. As the current method of spray irrigation to land is not resulting in adverse effects and provides a nutrient closed loop via cut and carry operation, this remains



the most beneficial in terms of obtaining nutrient value from the wastewater and optimising treatment costs.

9.3 Disposal of Stockyard Solids

The alternative options considered for the disposal of stockyard solids include:

- Disposal of stockyard solids to landfill;
- Composting;
- Alterations to the animal assembly; and
- Inclusion with processing wastewater without screening.

9.3.1 Disposal to Landfill

The use of stockyard solids for pasture growth is considered a more sustainable and environmentally friendly alternative than landfill disposal. The application of stockyard solids to land allows the reuse of nutrients to enhance pasture growth and soil quality.

To enable solids to be disposed of at a landfill, a solid content of at least 20% weight-by-weight basis is generally required. The solids would therefore require dewatering prior to disposal, with associated cost implications.

Furthermore, the costs associated with the transportation and disposal at a landfill of material that can be used as a soil conditioner makes disposal to a landfill an unattractive alternative.

9.3.2 Composting

Composting is an alternative method utilised by other Silver Fern Farms operations. This is carried out by mixing bark as a carbon source within stockyard solids material and protein material collected from the primary treatment and stored in windrows. The windrows are regularly turned and final composted material is not available until at least six months.

Production of compost requires a large land area of flat land, and appropriate buffer distances from dwellings as generation of localised odours do occur.



The key to maintaining a viable composting operation is having a local market with adequate needs for the volume of the final compost. Silver Fern Farms considers the cost of processing and stockpiling compost and the lack of a local viable market for the final product makes this option impractical. Composting does not offer any advantage over direct disposal of solids to pastoral land as a nutrient source to grow crops.

9.3.3 Alterations to the Animal Assembly

The floor within the animal assembly is grated and suspended above a concrete base. This design helps to keep livestock clean and makes yard cleaning more effective. Whilst this design is currently satisfactory, routine hosing of the concrete base can result in 'pellets' breaking up and discharging directly to wastewater as they are too small to be removed by screening.

The option of dry-cleaning has been considered to reduce water usage and provide a improved level of solids removal. However, the option has been discounted due to being financially unviable as the floor gratings would need to be lifted a number of meters to accommodate extra room for a machine (e.g. bobcat) to gather solids.

9.3.4 Inclusion with Wastewater Discharge

This option would remove the existing primary treatment measures and allow stockyard solids to be irrigated to land with the processing wastewater.

This option would result in a number of increased costs and constraints to the current system. This includes but is not limited to:

- Added disposal costs for solids from the DAF plant and wastewater sumps;
- Increase in sludge material within the wastewater storage pond requiring more frequent desludging; and
- Potential blockages of the travelling irrigator nozzles with pellets.
- Breakdown of stockyard solids into the wastewater stream would appear to be counter-intuitive to a sustainable operation.

9.3.5 Summary of Alternatives

During the term of the existing consent, Silver Fern Farms integrated the disposal of stockyard solids onto wastewater irrigation areas and purchased additional land. In



doing so, solids can be applied to Blocks A – E as a consented activity and Blocks F and G as a permitted activity. Moreover, Silver Fern Farms currently have enough land to deal with the volumes generated onsite as a permitted activity.

Whilst other alternatives are possible, these are considered either impractical or not viable. The current method of stockyard solids disposal onto land remains the most beneficial in terms of obtaining nutrient value from the solids, minimising the impact on the environment and optimising treatment costs.

9.4 Discharge of Domestic Wastewater

The alternative options considered for the discharge of domestic wastewater include:

- Discharging to a municipal sewer as tradewaste;
- Constructed wetland;
- Spray irrigation to land;
- Modifying application rate and frequency; and
- Incorporation with plant processing wastewater.

9.4.1 Discharge to Municipal Sewer as Tradewaste

The direct discharge from the processing plant into the Central Hawkes Bay District Council Takapau wastewater treatment plant has been considered. However, this option has been discounted on the basis that access to the Council network is not immediately available (piping and capacity constrained).

9.4.2 Constructed Wetland

Constructed wetlands are engineered treatment systems that utilise physical, chemical and biological processes similar to those that occur in natural wetland ecosystems.

This option would supplement current onsite treatment to further reduce contaminants within the waste stream. The current oxidation pond would continue to be the preceding treatment process to the constructed wetlands. Following this, wastewater would be discharged to an area vegetated with emergent plants adapted to wetland conditions either by:

- Surface flow – wastewater passes over the soil base through the stems and leaves of plants. The plants filter and remove nutrients and solids.



- Sub-surface flow – wastewater passes through a shallow gravel media and the plant roots. There is no surface flow.

Whilst this option is sound, and has previously been suggested by HBRC, PDP have indicated that the current land disposal method is effective with less than minor effects observed. Given this, Silver Fern Farms do not see the need to modify the current method of border dyke. This option has therefore been discounted.

9.4.3 Spray Irrigation to Land

In their review, PDP suggested spray irrigation as an alternative. Whilst this method would reduce the application rate to land, it has the potential to generate spray drift. Given the location of the existing treatment field and pond, investigations would need to be conducted to determine land availability once larger buffer distances were set and identified. Furthermore, if spray irrigation were to be installed, this would require a pump system, power supply and new reticulation network. The capital costs associated with these fixed systems would be more than the current method and given the effects of the current system have been assessed as less than minor; Silver Fern Farms have discounted this option.

9.4.4 Modifying Application Rate and Frequency

Operating the current border dyke system approximately every two weeks results in an instantaneous application rate of 50 mm per event. While this is not an excessive depth, it occurs very rapidly. PDP suggested the frequency of discharge events could be revised to weekly and overall discharge volumes be reduced. In doing so, this could potentially decrease the potential for ponding in certain areas of the domestic field.

Whilst this method will allow for lower pond levels to be maintained, it also will potentially result in overloading of the land area within proximity to the hydrant as reduced flows will not be able to 'flood' the dyke. It would also not provide enough stand down time for stock grazing to manage crop cover growth. It is on this basis that this option has been disregarded.



9.4.5 Incorporate with Processing Wastewater

The option to incorporate domestic wastewater with processing wastewater has been considered. This would involve the domestic wastewater being treated through the existing oxidation pond before being mixed with processing wastewater immediately prior to spray irrigation to land.

Whilst there are current buffer distances in place for spray irrigation, the inclusion of the domestic waste stream raises the concerns for public health. As spray irrigation has the potential to generate aerosols, bacteria and pathogens in the wastewater would mean changes are necessary in the wastewater handling procedures and the present buffer distances may not be sufficient, overall reducing the overall landholdings able to receive wastewater.

9.4.6 Summary of Alternatives

As the site is not accessible to a reticulation town sewage network, the utilisation of on-site treatment and disposal is considered the most practical treatment and disposal option. As previously mentioned, the existing domestic wastewater management system is considered to be operating well, with the oxidation pond of suitable size and providing sufficient treatment. As the existing system does not present any significant adverse environmental effects or potential health concerns, alternative options have not been considered further.

9.5 Stormwater Discharges to Land

The existing drainage system for Silver Fern Farms Takapau was purpose built and is effective in reusing water for various other uses throughout the plant. Whilst stormwater could be redirected to the wastewater network, in doing so there would be unwarranted construction costs in retrofitting drains to the current wastewater infrastructure. Moreover, influxes of stormwater could create additional problems and reduce the capacity of the wastewater storage pond during heavy rain events.

Given that historical and existing high-risk areas are already directed to the wastewater stream, there would appear no value in connecting all discharge points to this network.

The current method of reusing water for onsite processes is considered best practise and given that the non-potable pond has a long retention time and rarely overflows,



any effects on the environment are considered less than minor. As such, Silver Fern Farms considers there would be no benefit in altering any networks serving the non-potable pond and the best practical option is the continuation of existing activities.

9.6 Discharge to Air

Over the term of the existing consent there have been a number of continuous improvements that have changed the scale and intensity of discharges to air from the Silver Fern Farms Takapau plant. The most significant of these, specifically as a potential source of odour generation, was the closure of the onsite rendering / blood drying operation. Notwithstanding, boiler operations were also downsized however these are operated using 'clean' fuels (natural gas).

In light of this, discharges are now mainly from fugitive sources and Silver Fern Farms considers the effects of the emissions to air from current activities as less than minor. As such, the best practical option in respect of emissions to air, including odour, is the continuation of existing activities and consideration of alternatives is not required.



10 CONSULTATION

10.1 Overview

Consultation is an ongoing and integral part of all Silver Fern Farms operations. A number of groups and individuals have been consulted throughout the various stages of the resource consent application process for the Silver Fern Farms Takapau operation over the years. It must be noted that consultation at times also includes consulting our staff that generally reside and contribute to the community in and around our operation.

Throughout the consultation process and during previous discussions with potential affected parties Silver Fern Farms have obtained valuable input and feedback.

The groups / individuals consulted during the consent renewal application who are likely to have a direct interest were:

- Tangata whenua – specifically representatives from Te Rongo a Tahu and Rākautātahi marae;
- Hawkes Bay Regional Council;
- Peter and Diane Harris – Oruawharo Homestead;
- Tom and Judy Lavers – Neighbouring residents;
- Graeme Chapman – Neighbouring resident (Oruawharo Trust);
- Mark Nicholl - Neighbouring resident (Oruawharo Trust); and
- Robert Ellwood – Neighbouring resident.
- Rob Foley – Neighbouring landholder;
- Brad Foley – Neighbouring landholder; and
- Ian Ellis – Neighbouring landholder.

Throughout the consultation process and during previous discussions with potential affects parties, Silver Fern Farms have obtained valuable input and feedback.

10.2 Tangata Whenua

A meeting was held with representatives of Te Rongo a Tahu and Rākautātahi marae, on 16 November 2017 to discuss the consent renewals. At the meeting, Silver Fern Farms approached Iwi to give them the opportunity to write a cultural impact assessment (CIA) to provide with the renewal application. It was agreed that



a CIA would be carried out by that Puketotara Consultancy on behalf of Te Rongo a Tahu and Rākautātahi marae.

A second meeting was held on 28 February 2018 to discuss various aspects of the sites operations. This included visiting two areas of cultural significance, the Porangahau Stream and the wetlands which members of both marae were involved in planting. Other components of the operation were viewed including the wastewater treatment process, wastewater land-holdings and various methods of monitoring. During a third meeting (2 May 2018) the finalised version of the CIA was presented to Silver Fern Farms.

Specific concerns raised within the CIA included the overall health and mauri of the Porangahau Stream and the effects of wastewater irrigation on groundwater resources. In addition to the issues of concern, the marae / hapū identified that relationships between Silver Fern Farms and Tangata whenua were positive and will build an effective partnership into the future:

“We acknowledge the efforts of Silver Fern Farms to actively engage with hapū in recognising and providing for Māori cultural values associated within their company. We value the good relationship we have with Silver Fern Farms and are committed to an enduring partnership into the future”. (p.p 33, s. 6, CIA).

A number of recommendations were made within the CIA. These included:

- Ongoing consultation / regular meetings with Tangata whenua on any changes, updates or technical reports produced.
- Maintaining the non-irrigated buffer strips along the Porangahau awa.
- Utilising Tangata whenua to participate in any further riparian plantings or joint opportunities for environmental projects either on the Porangahau Stream or wider catchment.

Overall Iwi representatives were happy with the continual improvements that have been made onsite and support the resource consent renewal application.



10.3 Hawkes Bay Regional Council

As part of preparing this consent renewal application, Silver Fern Farms has sought advice from the Hawkes Bay Regional Council on a number of occasions, and this advice has been taken into account in the preparation of this application.

10.4 Oruawharo Homestead

The activities undertaken at the Homestead are by nature more sensitive due to guests and visitors having a higher expectation of amenity (weddings, high tea, opera etc). Given the relative incompatibility of these two neighbouring activities, there have been some odour complaints during the term of the existing consent.

Silver Fern Farms is aware and acknowledges the nature and sensitivity of the events held at the Homestead and their concerns of the impact of odour on the business. Following our ethic of continual improvement, Silver Fern Farms has made a number of changes over the term of the existing consent to minimise the potential for odour effects on the Homestead. These include:

- Working irrigation around notified scheduled events;
- Promptly responding to any issues;
- Developing an alert system to allow irrigation in Block D to be shut down when the wind direction is blowing towards the Homestead; and
- Redeveloped Block D into lucerne which is more drought resistant to enable less irrigation during their peak season (November – April).

A meeting was held with the owners of the Oruawharo Homestead on 10 May 2018.

The key discussion points are summarised below:

- The Homestead are happy to continue to provide a list of upcoming events;
- Pleased rendering and blood drying operations have ceased;
- Happy with quick response from the site if odours are detected;
- Suggested there could be further management of Block D around events in line with their peak season months (November – April);
- Identified intermittent noise from container loading – this is not relevant to the current consent renewal but will be addressed by the site.
- Open to future collaboration with Silver Fern Farms.



10.5 Neighbouring Residents

Discussions were held with neighbouring residents during May 2018 and June 2018 regarding the upcoming consent renewal application.

The neighbours are conscious of the rural environment they reside in. Whilst some noted that on occasion they have detected odour in the past, it was not considered offensive or objectionable within the rural context. No other specific concerns were raised and residents were generally happy with the continual improvements made by the company over the term of the existing consent.

In addition, a number of neighbours have indicated they would like to receive wastewater or stockyard solids from *the Operating Site* for their own landholdings. Whilst this option has not been considered in this application, it is not to be discounted for future opportunities.



11 CONCLUDING STATEMENT

Silver Fern Farms Takapau operation continues to be an integral and strategic site for Silver Fern Farms and the farming community in Central Hawkes Bay and further afield.

Silver Fern Farms and the Applicant accept that they have an obligation to manage resources sustainably, and to balance environmental effects and economic benefits. As part of its corporate culture and environmental policy, Silver Fern Farms states that the Company's goal is to minimise any adverse effects on the environment through our processing activities. The Company also subscribes to the principle of continuous improvement and regularly evaluates operations to enhance each site's environmental performance.

Silver Fern Farms Takapau operations have been continuing for a number of years, some 37 years since establishment in 1981. The environmental effects for all activities are well understood and well managed. During the term of the existing consent, the site have been committed to improving the land disposal operations and minimising adverse effects wherever possible; increasing the land area available for disposal, increased monitoring, closure of odorous departments (rendering / blood drying operations), and downsizing boiler operations.

The socio-economic benefits of the Application are considered considerably positive providing a diversity to the local economy, and employing up to 1,100 staff in peak season. In renewing the resources consents, the operation will be able to continue to operate and so sustain the current level of employment and contribution to the community.

Silver Fern Farms considers that the management controls and mitigation measures already implemented at the site, as described in this AEE, will result in the overall effects on the receiving environment being no more than minor. Given this, the Applicant contends that the consent renewal can proceed without any impediment.



12 NOTIFICATION

Section 94C of the RMA provides that an applicant may request an application for resource consent to be publicly notified.

Silver Fern Farms considers that with the use of preferential land based treatment of wastewater, improvements that have been made over the term of the current consent, and the generally supportive stance of Iwi and neighbours, the consideration for the replacement consents related to this application can progress on a non-notified basis.



13 ENVIRONMENTAL OUTCOMES

The conditions that are proposed to roll over are identified by plain text, any text to be removed is identified by ~~strikethrough text~~ and any amended conditions are identified by ***italicised underlined text***. Any descriptive information explaining the change is provided in *[italicised square brackets]* below the proposed condition.

13.1 Consent Duration

Ten years from consent (2018), expiring 2028.

13.2 Discharge to Air – DP030579A

Discharge Permit:

Silver Fern Farms Management Limited
PO Box 941
Dunedin 9054

To discharge products of combustion into the atmosphere from ~~one 4.8 MW, two 1.8 MW and one 950 KW natural~~ gas fired boilers ***with a net heat output of not more than 9 MW*** and;

[Whilst the 950 KW boiler has been removed from the site, decreasing the net output from 9.35 MW to 8.4 MW, Silver Fern Farms needs to retain some extra capacity in the event markets change and further onsite processing is required. Instead of listing each boiler would seem appropriate to the net heat output.]

To discharge contaminants (odour) into air from the following activities at a meat processing facility:

- i) Operating a refrigeration plant.**
- ii) Operating stockyards.**
- iii) Operating a refrigeration unit.**
- iv) Operating processing facilities.**
- v) Operating wastewater treatment systems.**
- vi) Vehicle movements and ancillary activities servicing those operations.**

[Making explicit the activities that occur on the site – some sources added from consent DP020333A]



Address of site: Fraser Road, Takapau
 Legal description: Part Lot 1 DP3357 and Lot 2 DP16838
 Map reference: U23: 2799400 – 6125945

General Conditions:

- 1 All works are structures relating to this resource consent shall be designed and constructed to conform to the best engineering practises and at all times maintained to a safe and serviceable standard.
- 2 The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions(s), the conditions(s) shall prevail.
- 3 **There shall be no discharge of offensive or objectionable discharge beyond any boundary of the property.**
Advice Note: The portion of Fraser Road, the Main Trunk Railway line, and Oruawhoro Road within the site is to be considered within the boundary for this condition.
[condition added from consent DP020333A to incorporate discharge of contaminants (odour) to air, and added clarification]
- 4 The boiler chimney shall be at least 13 metres high.
 The consent holder shall log all complaints received. The log shall include:
 - i) The date and time of the complaints;
 - ii) The nature of the complaint;
 - iii) The name, telephone number and address of the complainant;
 - iv) Weather information (as estimate of wind speed and direction);
 - v) Details of key operating parameters at the time of the complaint; and
 - vi) The remedial action taken to prevent further incidents.

Complaints shall be reported to the Council within 24 hours of receipt and the log of complaints shall be made available to the Council on request.

13.3 Discharge to Air – DP020333A

[Remaining activities to be combined under consent DP030579A]



Discharge Permit:

Silver Fern Farms Management Limited

PO Box 944

Dunedin 9054

To discharge contaminants (odour) into air from the following activities at a meat processing facility:

~~vii) — Rendering high quality animal (ungulates) matter including meal and blood drying processes.~~

~~[Rendering no longer carried out on site]~~

~~viii) — Operating a refrigeration plant.~~

~~[combined with Consent DP030579A]~~

~~ix) — Operating a hydrolysing unit.~~

~~[Hydrolysing unit no longer operating on site]~~

~~x) — Operating stockyards.~~

~~[combined with Consent DP030579A]~~

~~xi) — Operating a refrigeration unit.~~

~~[combined with Consent DP030579A]~~

Address of site:	Fraser Road, Takapau
Legal description:	Part Lot 1 DP3357 and Lot 2 DP16838
Map reference:	U23: 2799400 — 6125945

General Conditions:

- ~~1 The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions(s), the conditions(s) shall prevail.~~
- ~~2 There shall be no discharge of offensive or objectionable discharge beyond any boundary of the property.~~
- ~~3 Raw material such as soft offal, hard offal and blood shall be of high quality, free from decomposition, treated or stabilised as required and shall not have any objectionable odour prior to being processed.~~

~~[Rendering no longer carried out on site]~~



4 ~~Fallen stock and other animal material which has not been derived from the purpose built food processing plant or slaughter house shall not be processed in the plant.~~

5 ~~The cookers and dryers shall be operated at all times in such a manner as to avoid burning of product and generation of odorous pyrolysis products, and negative pressures shall be maintained at all times within the cookers to minimise fugitive emissions.~~

[Rendering no longer carried out on site]

6 ~~The discharge of dried blood or meal to atmosphere from any operation shall be controlled to ensure that particulate matter does not cause a nuisance at or beyond the boundary of the consent holders premises.~~

[Blood drying no longer carried out on site]

7 ~~All process air fumes from the cookers shall be controlled and treated, as described in the current application, or by some other method approved by Council.~~

[Rendering no longer carried out on site]

8 ~~The Consent holder shall log all complaints received. The log shall~~

~~(a) Date and time of complaint~~

~~(b) Date and time of alleged event complained about and the nature of the complaint~~

~~(c) The name, address and telephone number of the complainant (if available)~~

~~(d) Relevant meteorological information included an estimated of wind direction and wind speed at the time of the alleged event~~

~~(e) Details of key operating parameters of the process(es) likely to have caused the alleged complaint~~

~~(f) Remedial action taken if appropriate to prevent re-occurrence of the incident complained about, and any comment explaining the incident, and~~

~~(g) Comment if no cause for complaint is determined.~~

[condition combined with Consent DP030579A]

~~Complaints shall be reported to the Council by telephone within 24 hours of receipt, and confirmed in writing within seven days of receipt of the complaint. The complaint log shall be made available for inspection by Council officers on request.~~

[Condition combined with Consent DP030579A]



13.4 Discharge to Land – DP981040L

Discharge Permit:

Silver Fern Farms Management Limited
PO Box 941
Dunedin 9054

To discharge secondary treated sewage from an oxidation pond onto 1.6 ha of land through a border dyke system.

Address of site:	Fraser Road, Takapau
Map reference:	U23: 9900-2630
Legal description	Part Lot 1 DP3357
Effluent to be discharged:	Oxidation pond effluent
Maximum rate of discharge:	750 m ³ during any 21 day period

General Conditions:

- 1 All works or structures relating to this resource consent shall be designed and constructed to conform to the best engineering practises and at all times maintained to a safe and serviceable standard.
- 2 The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions(s), the conditions(s) shall prevail. Such information specifically includes; **Silver Fern Farms Takapau – Consent Renewal Application and Assessment of Environmental Effects. June 2018**
~~*Richmond Ltd – Takapau. Resource consent application and assessment of environmental effects of discharge to land of domestic wastewater. RIC 04, June 1998.*~~
[Document name amended to reflect current application]
- 3 The effluent **Domestic wastewater** shall be applied as discrete discharges 3 weeks apart over 1.6 ha as described below;
 - One discharge not exceeding 750 m³ to 0.8 ha (10 of the 20 borders) every 6 weeks, and



- Another discharge not exceeding 750 m³ to the other 0.8 ha 3 weeks later.

[Terminology updated to reflect discharge]

- 4 The consent holder shall, during each calendar year, take a composite sample of **domestic wastewater** ~~the effluent~~ over the period of discharge (the time interval between each subsample not exceeding 30 minutes). The sample shall be analysed for BOD₅ and Total Nitrogen.

[Terminology updated to reflect discharge]

- 5 All analysis, other than field measurements, required by the conditions of this consent shall be undertaken by an independence laboratory accredited to IANZ. All methodologies adopted shall be appropriate for water and wastewater analysis.

- 6 The consent holder shall record:
- The date and time of each discharge event;
 - The specific borders onto which each discharge occurs;
 - The volume of ~~effluent~~ **domestic wastewater** discharged during each discharge event.

[Terminology updated to reflect discharge]

- 7 All records and results of analysis collected in accordance with the conditions of this consent shall be provided to the Council (in electronic form) at monthly intervals, or at any other time that may be requested by the Council. Records shall be provided no more than seven days following the end of the month to which they relate.

- 8 Before 31 December ~~2000~~ and annually ~~thereafter~~, the consent holder shall provide the Council with a 'monitoring report' for the 12 month period ending at the previous 30 September. The monitoring report shall include;
- A summary of analysis and records collected in accordance with the conditions of this consent; and
 - A comment on the extent that each consent condition has been complied with.

[Lead in date removed to reflect ongoing reporting requirement]

13.5 Discharge to Land – DP981041L

Discharge Permit:



Silver Fern Farms Management Limited
PO Box 941
Dunedin 9054

To discharge;

- a) Stormwater from a catchment area of ~~9.6~~ **10** ha (approximately ~~4.8~~ **6** ha of which is impervious), and

[catchment areas updated to reflect current operation]

- b) Water from other sources (potentially containing contaminants)

To land where it may enter water, after passing through a detention pond.

Address of site:	Fraser Road, Takapau
Legal description	Pt Lot 1 DP 3357
Effluent to be discharged:	Stormwater, defrost water, untreated groundwater, water filter backwash, cooling water.

General Conditions:

- 1 The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions(s), the conditions(s) shall prevail. Such information specifically includes; **Silver Fern Farms Takapau – Consent Renewal Application and Assessment of Environmental Effects. June 2018** ~~*Richmond Ltd – Takapau. Resource consent application and assessment of environmental effects of the discharge of stormwater to land, RIC 05, June 1998.*~~
[Document name amended to reflect current application]

13.6 Discharge to Land – DP981039Lb

Discharge Permit:

Silver Fern Farms Management Limited
PO Box 941



Dunedin 9054

~~To discharge solids organic waste material (principally stockyard scrapings) to land.
[Combine and merge with discharge to land consent DP981043Ld & DP981044Ad]~~

Location

Site ID	Property Address	Legal Description	Map reference (at centre of site)
S1	Fraser Road, Takapau	Pt Lot 1 DP 3357 Pt of Blk 120	E1889606 N5564310
S2	Fraser Road, Takapau	Pt Lot 1 DP 3357	E1889850 N5566750
A	Fraser Road, Takapau	Sec 1S Maharakoke Settlement	E1890195 N5564585
B	Station Road, Takapau	Pt Lot 1 DP 3357	E1889062 N5566435
C	Oruawhara Road, Takapau	Lot 5 DP 6204	E1889940 N5563729
D	Oruawhara Road, Takapau	Lot 4 DP 6204	E1889235 N5563824
E	Fraser Road, Takapau	Pt Lot 1 DP 3357	E1889399 N5565781

~~[Locations merged with Locations of DP981043Ld & DP981044Ad. Site S1 is no longer to be used for the application of solids and will not be transferred]~~

General Conditions:

- 1 ~~All works or structures relating to this resource consent shall be designed and constructed to conform to the best engineering practises and at all times maintained to a safe and serviceable standard.
[Merged with consent DP981043Ld & DP981044Ad, condition 6]~~
- 2 ~~The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions(s), the conditions(s) shall prevail. Such information specifically includes;

 - a) ~~Richmond Ltd Takapau. Resource consent application and assessment of environmental effects of discharge of sheepyard wastes onto land, RIC 07, June 1998.~~
 - b) ~~Richmond Ltd Takapau. Application for variation of resource consent conditions for the abstraction of groundwater, the discharge of meat processing wastewater and discharge of yard solids. 6919RIC, November 2002.~~~~



~~c) Application to Change Conditions of Discharge to Land Resource consents – Assessment of Environmental Effects, Silver Fern Farms Limited – Takapau. Prepared by Pattle Delamore Partners Limited, February 2010.~~

~~[Merged with consent DP981043Ld & DP981044Ad condition 1]~~

3 Deleted.

4 Deleted.

5 The total nitrogen loading from solid organic waste material, fertiliser and wastewater discharged under DP981043Lb, to any discharge run in Blocks S1, S2 and Blocks A – E over any the period 1 October each year to 30 September the following year shall not exceed the following:

- ~~a) 600 kg per hectare on any cropped pastoral area; nor~~
- ~~b) 650 kg per hectare on any cropped lucerne area~~

~~[Merged with consent DP981043Ld & DP981044Ad, added to condition 14]~~

6 There shall be no discharge of waste solids within:

- ~~a) 20 metres of any surface water body;~~
- ~~b) 30 metres from any bore unless secure wellhead protection, to the satisfaction of the Council (Manager Compliance) is in place;~~
- ~~c) 50 metres of any surface water body during heavy rainfall;~~
- ~~d) 10 metres of any property boundary;~~
- ~~e) 50 metres of the Porangahau Stream.~~

~~[Merged with consent DP981043Ld & DP981044Ad, added to condition 18]~~

7 There shall be no offensive or objectionable odour beyond the boundary of the property. The 'property' is the outline area shown in Appendix 1 as the Takapau Plant Land Area.

~~[Merged with consent DP981043Ld & DP981044Ad, added to condition 22]~~

8 Deleted.

9 For each of the discharge sites, the consent holder shall maintain a detailed record of the solids organic waste material discharged, including the following:

- ~~a) The date and time of each application;~~
- ~~b) The discharge run onto which each application was made;~~
- ~~c) The volume of each application;~~
- ~~d) The total volume applied during the period 1 October to 30 September each year.~~
- ~~e) Deleted.~~



[Merged with consent DP981043Ld & DP981044Ad, added to condition 32]

40 ~~All records collected in accordance with the conditions of this consent shall be provided to the Council (in electronic form) at monthly intervals, or at any other time that may be requested by the Council. Records shall be provided no more than seven days following the month to which they relate. Raw laboratory data shall be provided to the Council (Manager Compliance) on request.~~

[Merged with consent DP981043Ld & DP981044Ad, condition 37]

41 ~~The Consent holder shall log all complaints received. The log shall include the date, time, and nature of the complaint and the name, telephone number, and address of the complainant, weather information (an estimate of wind speed and direction), details of key operating parameters at the time of the complaint and the remedial action taken to mitigate the effects of the incident and the steps taken to prevent further incidents. Complaints shall be reported to the Council within 24 hours of receipt and the log of complaints shall be made available to the Council on request.~~

[Merged with consent DP981043Ld & DP981044Ad, condition 38]

42 ~~Before 31 December 2000 and annually thereafter, the consent holder shall provide the Council with a monitoring report for the 12-month period ending at the previous 30 September. The format of the monitoring report shall be to the satisfaction of the Council (Manager Compliance) and shall include (but not be limited to);~~

- ~~a) A summary of analyses and records collected in accordance with the conditions of this consent; and~~
- ~~b) A comment on the extent that each consent condition has been complied with.~~

[Merged with consent DP981043Ld & DP981044Ad, condition 39]

43 ~~A representative sample of solid organic waste material shall be collected in August and February each year from the milliscreen and analysed for Total Kjeldahl Nitrogen and Total Solids. The sample collection point and methodology shall be specific in the Wastewater and Solids Management Plan required by condition 56 of DP981043Lb. the results of the analysis shall be provided to the Council in accordance with condition 10 of this consent.~~

[Merged with consent DP981043Ld & DP981044Ad, added to condition 24]



- 44 ~~The total nitrogen from solid organic waste material applied to each discharge run annually shall be included in the nutrient mass balance required under condition 47 of DP981043Lb.~~

[Merged with consent DP981043Ld & DP981044Ad, condition 47]

13.7 Discharge to Land – DP981043Ld & DP981044Ad

Discharge Permit:

Silver Fern Farms Management Limited

PO Box 941

Dunedin 9054

To discharge partially treated meat processing plant wastewater **and solids organic waste material (principally stockyard scrapings)** onto land, in circumstances which may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water, and to discharge odorous compounds and aerosols into the air associated with the discharge of meat processing plant wastewater.

[Merge wastewater and solids organic waste material consents]

Location

Block ID (see Appendix 1)	Legal Description	NZTM Reference (at centre of site)
A	Sec 1S Maharakeke Settlement	E1890195 N5564585
B	Pt Lot 1 DP 3357	E1889062 N5566435
C	Lot 5 DP 6204	E1889940 N5563729
D	Lot 4 DP 6204	E1889235 N5563824
E	Pt Lot 1 DP 3357	E1889399 N5565781

General Conditions:

Activity definition

- The consent holder shall undertake all operations in accordance with any drawings, specifications, statements of intent and other information supplied as part of the application for this resource consent. In the event that there is conflict between the information supplied with the application and any consent conditions, the conditions shall prevail. Such information specifically includes;



- a) *Richmond Ltd – Takapau. Resource consent application and assessment of environmental effects for the land treatment of meat processing effluent. RIC 08, June 1998.*
- b) *Richmond Ltd – Takapau. Resource consent application and assessment of environmental effects for the emissions to air from the land application meat processing effluent. RIC 09, June 1998.*
- c) *Richmond Ltd – Takapau. Proposed Management Plan for the land treatment of meat processing effluent. RIC 08-2, June 1998.*
- d) *Richmond Ltd Takapau. Application for variation of resource consent conditions for the abstraction of groundwater, the discharge of meat processing wastewater and discharge of yard solids. 6919RIC, November 2002.*
- e) *Application to Change Conditions of Discharge to Land Resource consents – Assessment of Environmental Effects, Silver Fern Farms Limited – Takapau. Prepared by Pattle Delamore Partners Limited, February 2010.*
- f) *Application to Change Consent Conditions of Discharge to Land Resource Consent application, dated 23 November 2015, received by the Council on 2 December 2015.*
- g) **Silver Fern Farms Takapau – Consent Renewal Application and Assessment of Environmental Effects. June 2018**
[Original Condition 1, and included document name of current application]

- 2 The volume of waste **water** discharged shall not exceed 35,000 cubic metres during any 7 day period, nor 1,365,000 cubic metres during the period 1 October each year to 30 September the following year.
[Original Condition 2, and corrected error]
- 3 The wastewater shall be passed through screens having a maximum aperture of 1.5 mm before being discharged.
[Original Condition 3]
- 4 The wastewater shall contain no domestic sewage (excluding separated grey water), fellmongery waste, tannery waste nor chemical waste from the processing of casings (other than common salt (NaCl)). No imported wastewater other than truckwash and stock holding tank effluent shall be discharged.
[Original Condition 4]



4A Canceled.

Administrative

5 The consent holder shall appoint a person to be responsible for the day-to-day operation of the wastewater **and stockyard solids** disposal system and to act as a contact for Regional Council staff. The name and phone number of this contact person shall be advised to the Council within 10 working days of the commencement of this consent and within 10 working days of any change.

[Original Condition 5 modified to include stockyard solids]

Mitigation of effects

6 All works are structures relating to this resource consent shall be designed and constructed to conform to the best engineering practises and at all times maintained to a safe and serviceable standard.

[Original Condition 6]

7 Canceled.

8 Canceled.

7 Wastewater shall only be discharged using travelling irrigators operating at a pressure between 200 and 350 kPa.

[Original Condition 9]

8 When operating during daylight hours during the working week, the consent holder shall regularly undertake visual observations of the irrigation network to ensure it is operating correctly. Written records of these observations shall be kept, and made available upon request to the Council (Manager Resource Use).

When operating during the hours of darkness, and over the weekend, all travelling irrigators fitted with an effective monitoring system that will shut down the pump to the irrigator should the pressure drop below 200 kPa that are in working order, shall be used, spread across the irrigation network, to detect any significant pressure drop. The consent holder shall undertaken regular maintenance on the travelling irrigators and take all reasonable measures to ensure as many travelling irrigators fitted with monitoring systems are in operation during the hours of darkness, and weekends.

[Original Condition 9A]

9 Irrigation blocks A – E shall be classified into one of the 'management classes' identified below. ~~Before exercising this consent, and before 31~~



August each year, the consent holder shall provide the Council with a map identifying the management classification of each of the irrigation runs for the period 1 October each year to 30 September the following year. Any changes to the management classes after 31 August each year shall be submitted to the Council (Manager Resource Use) in writing.

[Original Condition 10]

Management classes

- a) ~~Cancelled;~~
- b) *Managed cropped pastoral*: Standard pastoral cropping where hay, silage or other crops (including greenfeed) are removed off-site.
- c) *Managed cropped lucerne*: Lucerne cropping. The crop is cut as frequently as is practicable and removed from the site.
- d) ~~Cancelled;~~
- e) ~~Cancelled~~

[Now that the management classifications have been reduced to two, for streamlining purposes the management class will be identified in the annual report]

10A ~~Cancelled.~~

11 ~~Cancelled.~~

12 ~~Cancelled.~~

13 ~~Cancelled.~~

10 The total nitrogen from wastewater, 'fertiliser', **stock**, and solid organic waste material discharged under DP981039Lb, to any irrigation run in Blocks A – E over the period 1 October each year to 30 September the following year shall not exceed:

- a) ~~Cancelled;~~
- b) 600 kg per hectare on any cropped pastoral area; nor
- c) 650 kg per hectare on any cropped lucerne area;
- d) ~~Cancelled;~~
- e) ~~Cancelled;~~
- f) ~~Cancelled.~~

[Original Condition 14. Reference to consent DP981039Lb deleted as proposed to merge the two consents and stock added to allow for pastoral management]

15 ~~Cancelled.~~



- 11 There shall be no surface runoff of wastewater to adjoining properties (including roads), or to water.

[Original Condition 16]

- 12 ~~No ponding of wastewater for more than 6 hours shall occur up until 30 September 2014, and~~ no ponding of wastewater for more than 2 hours shall occur ~~after 30 September 2014~~. Nor shall any wastewater be applied to areas where there is surface ponding.

[Original Condition 17. Condition updated to reflect current practice and remove lead in times and changes from the 2010 variation]

- 13 There shall be no discharge of wastewater or solids within:

Separation Distances	Wastewater	<u>Solids</u>
From any Surface Water body	20m	<u>20m</u>
From any Property Boundary	20m	<u>10m</u>
From any bore unless secure wellhead protection, to the satisfaction of the Council (Manager Resource Use), is in place.	30m	<u>30m</u>
The Porangahau Stream	NA	<u>50m</u>
Metres of any occupied dwelling existing on 1 April 1999	150m	<u>N/A</u>
Metres of any occupied downwind dwelling existing on 1 April 1999	500m	<u>N/A</u>
Meters from any bore used for drinking water purposes existing on 1 April 1999	50m	<u>N/A</u>

- a) ~~20 metres of a surface water body;~~
 b) ~~20 metres of any property boundary;~~
 c) ~~30 metres from any bore unless secure wellhead protection, to the satisfaction of the Council (Manager Resource Use), is in place.~~
 d) ~~150 metres of any occupied dwelling existing on 1 April 1999;~~
 e) ~~500 metres of any occupied downwind dwelling existing on 1 April 1999;~~
 f) ~~50 metres of any bore used for drinking water purposes existing on 1 April 1999.~~



[Original Condition 18. Separation distances from Solids discharge consent DP981039Lb Condition 6 added]

- 14 No wastewater shall be discharged on to any part of the 'E-wet' irrigation area when the soil moisture deficit is less than 20 mm, i.e. when the soil moisture is greater than 45 mm.

[Original Condition 19]

- 20 ~~Cancelled.~~

- 15 The wastewater 'storage' pond shall be emptied ('empty' is containing less than 500 m³ of wastewater) at least once each operating day, unless soil moisture conditions are not conducive to irrigation.

[Original Condition 21]

- 16 ~~Within one year of the granting of this consent~~ There shall be no more than minor visible deposition of particulate material, including fats, on the surface of the land application area after any discharge of wastewater. (For the purpose of determining "more than minor visible deposition" refer to Advice Note 1).

[Original Condition 21A. Condition updated to current practice removing lead in time from 2010 variation]

- 17 There shall be no offensive or objectionable odour beyond the boundary of the property. The 'property' is the outline area shown in Appendix 1 as the Takapau Plant Land Area.

[Original Condition 22]

Monitoring

- 18 All analysis, other than field measurements, required by the conditions of this consent shall be undertaken by a laboratory independently accredited by IANZ. All methodologies adopted shall be appropriate for water and effluent analysis.

[Original Condition 23]

- 19 ~~Prior to July 2012,~~ the consent holder shall, fortnightly during each calendar month of operation, take a — ***time flow*** proportional sample (~~maximum time interval of 1 hour~~) from within the discharge pipe at the wastewater storage pond, and analyse it for the following:

- a) pH
- b) COD
- c) Total suspended solids
- d) Chloride



- e) Ammoniacal nitrogen
- f) Total Kjeldahl Nitrogen
- g) Total phosphorus
- h) Dissolved reactive phosphorus
- i) Total fat
- j) Potassium
- k) Calcium
- l) Magnesium
- m) Sodium
- n) E.coli

[Original Condition 24. condition updated to reflect current sampling procedure and remove lead in times provided for in the 2010 consent Variation]

- 24A ~~From 1 July 2012, the consent holder shall, fortnightly during each calendar month of operation, take a 24-hour time flow proportional sample (at intervals to be agreed upon with the Manager Resource Use) from within the discharge pipe at the wastewater storage pond, and analyse it for the analytes listed in condition 24 of this consent.~~

[Original Condition 24A. Condition deleted. Requirements covered by amended condition 24]

- 20 **A representative sample of solid organic waste material shall be collected in August and February each year from the milliscreen and analysed for Total Kjeldahl Nitrogen and Total Solids. The sample collection point and methodology shall be specific in the Wastewater and Solids Management Plan required by condition 56. The results of the analysis shall be provided to the Council in accordance with condition 37 of this consent.**

[Condition for the analysis of solids added as part of merge of wastewater and solids consents]

- 21 ~~Soil water shall be sampled from at least three lysimeters installed and maintained on each of the blocks A, B, C, D and E-dry. At least three lysimeters shall be located in a non-irrigated control block, and on the area known as E-wet. Relocation and installation of any existing lysimeters shall be complete within six months of the granting of this consent. The installation of all new lysimeters required by this consent shall be complete within 18 months of the granting of this consent. The location and~~



installation details of any relocated or new lysimeters to be installed shall be agreed upon with Hawkes Bay Regional Council (Manager Resource Use), prior to their installation.

- i. Cancelled
- ii. ~~Cancelled.~~
- iii. ~~Cancelled.~~

Each sample shall be analysed for the analytes at the frequency shown in Table 1 below:

Table 1: Soil water monitoring programme

Analyte	Sampling frequency
Volume	Once every fortnight
Nitrate Nitrogen	Once every fortnight
Ammoniacal Nitrogen	Once every fortnight
Total Kjeldahl Nitrogen	Once every fortnight
Nitrite Nitrogen	Once every fortnight

[Original Condition 25. Condition amended to reflect installation of lysimeters completed]

- 22 The consent holder shall ~~establish and maintain groundwater monitoring bores, at the locations described in Table 2 (see Advice Note 2). The consent holder shall install any new bores in accordance with Hawkes Bay Regional Council guidelines and shall provide the bore logs to the Council. Any bores listed in Table 2 that are not drilled and operational at the time this consent is granted shall be drilled and operational within six months of the granting of this consent. Except that:~~
- ~~Bore 15958 need only be established if monitoring from bore 4455 is to be phased out.~~
 - ~~Bore 15871 need only be established if monitoring from bore 2898 is to be phased out.~~
 - ~~Bore 15963, need only be established if bore 15638 is to be phased out.~~

~~If weather is not conducive to establishing monitoring bores within six months, then establishment timing to be by agreement with the Hawkes Bay Regional Council and to be carried out by 31 Dec 2012.~~

[Original Condition 26 All monitoring bores have now been established and agreed with the Council. No bores have been phased out]



Table 2: Groundwater monitoring bores

HBRC Bore ID [previous ref No(s).]	Location & depth of bore
HBRC Bore ID 15636 [2425]	<p>HBRC Bore ID 15636 – Immediately up-gradient of any potential effects on groundwater quality of the proposed discharge to Block E. Existing bore is 14m deep with its screen located in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1888522 N5565635.</p>
HBRC Bore ID 4456 [2426]	<p>HBRC Bore ID 4456 – Immediately up-gradient of any potential effects to Area B. Screen to be located in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1888750 N5564196.</p>
HBRC Bore ID 15954	<p>HBRC Bore ID 15954 – Just prior to the south west corner of Block E, up-gradient of any potential effects on groundwater quality of the proposed discharge to Block E. Bore is 45 m deep with its screen located in the intermediate (or 'main') semi-confined aquifer at a depth of 25 to 45 metres.</p> <p>Bore located at or about NZTM E1888755 N5565189.</p>
HBRC Bore ID 15957	<p>HBRC Bore ID 15957 – Just prior to the south west corner of Block E, up-gradient of any potential effects on groundwater quality of the proposed discharge to Block E. Bore is 6.6 m deep with its screen located in the shallow unconfined or semi-confined aquifer at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1888756 N5565193.</p>
HBRC Bore ID 15871	<p>HBRC Bore ID 15871 – In the north east corner of Block C at a site where any effects on the groundwater quality of the proposed discharge are most likely to be detected. Bore is 45.5 m deep with its screen located in the intermediate (or 'main') semi-confined aquifer at a depth of 25 to 45 metres.</p> <p>Bore located at or about NZTM E1890351 N5565963</p>
HBRC Bore ID 15958	<p>HBRC Bore ID 15958 – In the north east corner of Block C at a site where any effects on the groundwater quality of the proposed discharge are most likely to be detected. Bore is 6.04 m deep with its screen located in the shallow unconfined or semi-confined aquifer at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1890357 N5565964</p>
HBRC Bore ID 4455 [2429]	<p>HBRC Bore ID 4455 – Immediately down-gradient of Block C at a site where any effects on the groundwater quality of the proposed discharge are most likely to be detected. Existing bore is 9.6 m deep with its screen located in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres. If monitoring of this bore is to be phased out in favour of new bore 15958, then transitional activities required: bore to be monitored until Bore 15958 has been monitored for 3 years.</p> <p>Bore located at or about NZTM E1890778 N5564102</p>
HBRC Bore ID 2898 [2433]	<p>HBRC Bore ID 2898 – Immediately down-gradient of Block C at a site where any effects on the groundwater quality of the discharge are likely to be detected. Existing bore is 28 m deep with its screen located in the intermediate (or 'main') semi-confined aquifer that occurs at a depth of 25 to 45 metres. If monitoring of this bore is to be phased out in favour</p>



	<p>of new bore 15871, then transitional activities required: bore to be monitored until Bore 15871 has been monitored for 3 years.</p> <p>Bore located at or about NZTM E1890987 N5564064</p>
HBRC Bore ID 15872	<p>HBRC Bore ID 15872 – Immediately up-gradient of any potential effects to Block B, Bore is 12.51 m deep with its screen located in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1888777 N5564253</p>
HBRC Bore ID 15959	<p>HBRC Bore ID 15959 – On the terrace up-gradient of any potential effects to Block D. Bore is 45 m deep with its screen located in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1888586 N5563936</p>
HBRC Bore ID 15955	<p>HBRC Bore ID 15955 – Immediately up-gradient of any potential effects to Block B. Bore is 44.24 m deep and screened in the intermediate (or 'main') semi-confined aquifer at a depth of 25 to 45 metres.</p> <p>Bore located at or about NZTM E2798747 N5564254</p>
HBRC Bore ID 15960	<p>HBRC Bore ID 15960 – In the control quadrant of Block C, up-gradient of any potential effects to Block C south of Oruawharo Road. Bore is 45 m deep with its screen in the shallow unconfined (or semi-confined) aquifer which occurs at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1889586 N5563502</p>
HBRC Bore ID 15869	<p>HBRC Bore ID 15869 – Immediately down-gradient of Block E and G at a site where any effects on the groundwater quality of the proposed discharge and any activities occurring on Block G are most likely to be detected. Bore is 45.13 m deep with its screen in the intermediate (or 'main') semi-confined aquifer that occurs at a depth of 25 to 45 metres.</p> <p>Bore located at or about NZTM E1890383 N5566653</p>
HBRC Bore ID 15961	<p>HBRC Bore ID 15961 – Immediately down-gradient of Block E and G at a site where any effects on the groundwater quality of the proposed discharge and any activities occurring on Block G are most likely to be detected. Bore is 10.5 m deep with its screen in the shallow unconfined (or semi-confined) aquifer at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1890381 N5566647</p>
HBRC Bore ID 15870	<p>HBRC Bore ID 15870 – Immediately down-gradient of Block G where any effects on the groundwater quality of the proposed discharge and any activities occurring on Block G are most likely to be detected. Bore is 45 m deep with its screen in the intermediate (or 'main') semi-confined aquifer that occurs at a depth of 25 to 45 metres.</p> <p>Bore located at or about NZTM E1890608 N5565541</p>
HBRC Bore ID 15962	<p>HBRC Bore ID 15962 – Immediately down-gradient of Block G where any effects on the groundwater quality of the proposed discharge and any activities occurring on Block G are most likely to be detected. Bore is 7.35 m deep with its screen in the shallow unconfined (or semi-confined) aquifer at a depth of 5 to 15 metres.</p> <p>Bore located at or about NZTM E1890605 N5565541</p>
HBRC Bore ID 15935	<p>HBRC Bore ID 15935 – Immediately down-gradient of Block A at a site where any effects on groundwater quality of the proposed discharge are most likely to be detected. Bore is 45 m deep with its screen in the intermediate (or 'main') semi-confined aquifer that occurs at a depth of 25 to 45 metres.</p>



	Bore located at or about NZTM E1890682 N5565038
HBRC Bore ID 15963	HBRC Bore ID 15963 – Immediately down-gradient of Block A at a site where any effects on groundwater quality of the proposed discharge are most likely to be detected. Bore is 14.2 m deep with its screen in the shallow unconfined (or semi-confined) aquifer at a depth of 5 to 15 metres. Bore located at or about NZTM E1890678 N5565026
HBRC Bore ID 15638	HBRC Bore ID 15638 – Immediately down-gradient of Block A at a site where any effects on groundwater quality of the discharge are most likely to be detected. Existing bore is 15.96 m deep with its screen located in the shallow unconfined (or semi-confined) aquifer at a depth of 5 to 15 metres. If monitoring of this bore is to be phased out in favour of new bore 15963, then transitional activities required: bore to be monitored until Bore 15963 has been monitored for 3 years. Bore located at or about NZTM E1890984 N5565635
HBRC Bore ID 6720 [2430]	HBRC Bore ID 6720 – At a site where any effects on groundwater quality of parts of the discharge area are likely to be detected. Existing bore is 45.7 m deep with its screen located in the intermediate (or 'main') semi-confined aquifer that occurs at a depth of 25 to 45 metres. Bore located at or about NZTM E1889627 N5564898
Previous Ref No(s) relate to Site ID superseded by HBRC bore ID. <i>Note: This consent does not authorise the drilling of any new monitoring bores – specific 'bore permits' must be obtained.</i>	

- 23 ~~The elevation (in metres above sea level) of the top of the casing of each monitoring bore shall be determined by the consent holder to an accuracy of ±0.05m, and advised to the Council within 90 days of the drilling of the bore.~~

[Original Condition 27. Condition deleted as measurements were taken and provided to the council]

- 24 Samples shall be taken from the monitoring bores identified in condition 26 in accordance with "A National Protocol for State of the Environment Groundwater Sampling in New Zealand" (November 2006) and analysed, at the frequency shown in Table 3 below, for the analytes also shown. (Advice note 3)

Table 3: Groundwater monitoring programme

Analyte	Sampling frequency
pH	Once every 2 months
Conductivity	Once every 2 months
Sodium	Once every 2 months
Nitrate Nitrogen	Once every 2 months
Ammoniacal Nitrogen	Once every 2 months
Total Kjeldahl Nitrogen	Once every 2 months
Chloride	Once every 2 months
E. coli	Once every 2 months



[Original Condition 28]

29 ~~Cancelled.~~

25 When samples are taken in accordance with condition ~~28-24~~, the consent holder shall measure and record the date, time and water level (before purging the bore), in each of the monitoring bores identified in condition 26. The water level shall be measured from the top of the casing, and shall be recorded to the nearest 0.01 metres.

[Original Condition 30, and updated consent numbering]

26 Water shall be sampled at the sites detailed in Table 4 at a frequency of once every month and analysed for the following:

- a) pH
- b) Temperature
- c) Dissolved oxygen
- d) Chloride
- e) Nitrate Nitrogen
- f) Ammoniacal Nitrogen
- g) Dissolved reactive phosphorus
- h) E. coli
- i) Total Kjeldahl Nitrogen

Table 4: Surface water monitoring sites

Site ID	Description	NZTM Ref
397	Porangahau Stream upstream of discharge	At or about E1889114 N5564779
2431	Porangahau Stream downstream of discharge	At or about E1890768 N5565456
*Site ID' is the HBRC water quality database ID number		

[Original Condition 31]

New Conditions following s127 Application 13 April 2010

27 The consent holder shall engage in the services of a suitably qualified ecologist to undertake macroinvertebrate monitoring at the sites listed in Table 4 of this consent. The sampling shall be undertaken once annually during the period 1 January to 31 March, at least 4 weeks following a "significant fresh". For the purpose of this consent a "significant fresh" is defined as 3 times the median flow (see Advice Note 5). The results of the sampling shall be submitted to the Council within one month of being



received by the consent holder.

[Moved from condition 48]

- 28 The rate of wastewater application to land, over all blocks, shall comply with the following **(unless soil moisture level is below optimum for plant growth then a variable return period is allowable):**

Maximum Application Depth (mm per application)	Minimum Return Period (Days)
Up to 30	7
31 to 45	10
46 to 65	14

[Moved from condition 40, In summer months when soil moisture levels are significantly reduced and plants pass wilting point, additional wastewater may be required to overcome evapotranspiration effects]

- 29 The discharge of wastewater to land shall not exceed 65 mm per application, **when a variable return period is required, this may be more to account for evapotranspiration losses.**

[Moved from condition 41. In summer months when soil moisture levels are significantly reduced and plants pass wilting point, additional wastewater may be required to overcome evapotranspiration effects]

- 30 ~~From 1 July 2014,~~ the field capacity of any irrigated soil shall not be exceeded as a result of the discharge of wastewater.

[Moved from condition 42. Lead in time deleted]

- 31 The consent holder shall maintain flow meters on every travelling irrigator in accordance with the Councils "*Technical Specifications and Installation Requirements for Flow Meters*" (February 2010) (as attached).

[Moved from condition 43]

- 32 For every irrigator on which telemetry equipment has not been installed, the consent holder shall read the wastewater flow meters at daily intervals and shall provide the Council with a record of the following:

- a) The meter readings (in cubic metres);
- b) The daily volume of wastewater discharged to each block (in cubic metres);
- c) The date and time of each reading;
- d) The block that the record relates too.

This information shall be supplied no later than 7 days after the end of each month.



For irrigators on which telemetry equipment has been installed, that equipment shall be capable of measuring the instantaneous discharge rate (L/sec) and the daily volume of wastewater discharged (m^3) to each irrigator, to an accuracy of +/-5%. The telemetered flow meters shall be maintained in accordance with the Councils "*Technical Specifications and Installation Requirements for Flow Meters*" (February 2010). Rates, volumes, pressures, location and speeds shall be recorded every 15 minutes, and every 15 minute interval of data shall be date and time stamped with the New Zealand Standard Time at the end of the 15 minute interval. Data shall be transmitted to the Hawkes Bay Regional Council telemetry system at least once per day.

[Moved from condition 44]

- 33 The consent holder shall ~~install, to the satisfaction of the Council (Manager Resource Use), and~~ maintain telemetered rainfall measuring equipment at the site that is capable of measuring rainfall (mm) in real time.

[Moved from condition 45. Deletion to reflect weather station has been installed]

- 34 The mass and rate of total nitrogen applied to each irrigation run during each application of wastewater, as specified in condition ~~32(d)~~ **34(d)** of this consent, shall be calculated as follows:
- a) The average monthly total nitrogen concentration (g/m^3) shall be calculated by averaging the last wastewater sample from the previous month and the two wastewater samples in the month to be calculated. These samples shall be taken in accordance with condition 24 of this consent.
 - b) The average monthly total nitrogen concentration for each month shall then be multiplied by the volume (m^3) of wastewater applied to each irrigation run, in order to calculate the mass of total nitrogen applied (kg) per application to each irrigation run.
 - c) The mass of total nitrogen applied (kg) per application shall then be divided by the area (ha) of each irrigation run to calculate the rate (kg N/ha) of nitrogen loading per application per irrigation run.
 - d) The area (ha) irrigated during each application of wastewater shall be calculated by multiplying the distance the irrigator travelled by the irrigation run width.



[Moved from condition 46, and updated amended consent numbering]

- 35 By 30 September each year the consent holder shall submit to the Council (Manager Resource Use) the results of analysis of soil samples taken from areas representative of each soil type and cover crop combination within the **approx.** 213 hectares of land application area. The soil sampling shall be undertaken by a suitably qualified person approved by the Council (Manager Resource Use) prior to the commencement of sampling.

[Moved from condition 49]

- 36 The soil samples required by condition ~~49~~**35** shall be analysed for the following:

- a) Olsen-P
- b) Total phosphorus
- c) pH
- d) Soil moisture
- e) Cation Exchange Capacity
- f) Total Base Saturation
- g) Calcium
- h) Potassium
- i) Magnesium
- j) Sodium
- k) Anion Storage Capacity
- l) Total Organic Carbon
- m) Available Nitrogen (Anaerobic Mineralisable N)

[Moved from condition 50, and updated amended consent numbering]

- 37 The soil samples for each area sampled shall consist of 0-75 mm cores collected along a stretched 'W', or 'X' transect, or a grid pattern in each area. Each sample shall consist of not less than 20 entire cores to form a composite sample.

[Moved from condition 51]

- 38 The consent holder shall record the GPS location, operating wind speed (m/s) and operating pressure (kPa) of each of the travelling irrigators used to discharge wastewater on which GPS equipment has been installed, at all times when they are in operation. For irrigators on which GPS equipment has not been installed, the consent holder shall record the GPS location of



the irrigator, and time, at the start, and end, of each irrigation run.

[Moved from condition 52]

39 All time-series data required to be recorded by Condition ~~35, 46~~ 43, 31, 45 33 and 52 38 shall:

- a) Record the rates, volumes, pressures, location and speeds every 15 minutes. Each 15 minute interval of data shall be date and time stamped with the New Zealand Standard Time at the end of the 15 minute interval.
- b) Data shall be transmitted to the Hawkes Bay Regional Council telemetry system at least once per day.
- c) Shall be transmitted in a format compatible with Hawkes Bay Regional Council telemetry system and storage system.

[Moved from condition 53, and updated amended consent numbering]

40 The consent holder shall calibrate the wastewater and waste solids irrigators in accordance with the method outlined in the "~~Wastewater and Solids Management Plan~~" **Integrated Land Management Plan** at least once every three months to determine the irrigator application rate (in mm per pass or mm per hour). The results of each calibration shall be recorded and submitted to the Council (Manager Resource Use) in accordance with condition 37 of this consent.

[Moved from condition 54. Condition updated to reflect new management plan]

~~55 There shall be no grazing of stock at any time of blocks A-E without the prior approval of the Hawkes Bay Regional Council (Manager Resource Use).~~

~~*[Moved from condition 55. Condition deleted. Grazing is recorded and included in total nitrogen loadings and calculations as per condition 14]*~~

41 The consent holder shall undertake all operations in accordance with a written ~~Wastewater and Solids Management~~ **Integrated Land Management Plan** held on site that includes (but is not limited to):

- a) A description of the purpose of the plan;
- b) The names and contract phone numbers and addresses of key personnel;
- c) A general description of the activities undertaken at the site;



- d) Identification of the potential sources of contamination of groundwater and surface water and odour.
- e) A full description of the systems in place to prevent contamination of groundwater and surface water and odour.
- f) Relevant operating procedures that need to be undertaken and the frequency by which they must be undertaken;
- g) Details of the method used to calibrate the travelling irrigators at each of the speeds they are operated at and to calibrate the wastewater solids irrigators.
- h) An inventory of relevant equipment and materials;
- i) An equipment maintenance programme;
- j) A contingency plan in the event that there is an adverse effect as a result of contamination of groundwater or surface water, or an offensive or objectionable odour beyond the boundary;
- k) A list of records that need to be kept including maintenance and control parameters, weather records and complaint and investigation records;
- l) A description of staff training relating to the management of wastewater, including methods, frequency and training records;
- m) A description of the process for reviewing the overall system performance.

[Moved from condition 56, Condition updated to reflect new management plan name]

- 42 The consent holder shall review and update the ~~Wastewater and Solids Management~~ **Integrated Land Management** Plan at least every two years and shall provide a copy of the ~~Wastewater and Solids Management~~ **Integrated Land Management** Plan to the Council (Manager Resource Use) on request.

[Moved from condition 57. Condition updated to reflect new management plan name]

- 58 ~~No later than one year prior to the expiry of the consent, the consent holder shall submit to the Council (Manager Resource Use) a peer reviewed report that details (but is not limited to) future wastewater treatment, discharge and storage options. The purpose of the report will be to initiate pre-application discussions with the Hawkes Bay Regional Council, prior to the~~

application for a new consent.

[Moved from condition 58. Delete as completed]

- 59 This consent is complementary to and is exercised in conjunction with consent number DP981039Lb.

[Moved from condition 59. Deleted, consents have been combined]

Reporting

- 43 The consent holder shall maintain a detailed record of wastewater discharged to each irrigation block, including the following;
- a) The date and time of each application of wastewater **or solids**;
 - b) The soil moisture at the start of each application of wastewater to any run in Block E-wet;
 - c) The irrigation run onto which the wastewater **or solids were** was applied;
 - d) The mass (kg) and rate (kg N/ha) of total nitrogen applied to each irrigation run during each application of wastewater;
 - e) The total cumulative nitrogen applied from all sources to each irrigation run over the period 1 October each year to 30 September the following year (see Advice Note 4);
 - f) The hydraulic loading (application depth in mm) for each application of wastewater to each irrigation run;
 - g) ~~Cancelled;~~
 - h) The volume (m³) of wastewater **or solids** applied to each irrigation run for each application.

[Moved from Condition 32. Solids discharge consent DP981039Lb Condition 9 added]

- 44 The consent holder shall maintain a record of all activities associated with the wastewater **and solids** disposal system, including;
- a) ~~Cancelled;~~
 - b) ~~Cancelled;~~
 - c) ~~Cancelled;~~
 - d) The total volume (m³) of wastewater **or solids** discharged each day;
 - e) The weather conditions, including daily rainfall, potential evapotranspiration, hourly wind speed and direction;
 - f) Details of pipeline flushing.

[Moved from condition 33]

- 45 The consent holder shall maintain records of:



- a) The weight of dry matter removed from each irrigation area; and
- b) The nitrogen content of that dry matter.
- c) The name and mass (kg) and rate (kg N/ha) of any nitrogen based fertilisers applied, the irrigation block this has been applied to and the date of application.

[Moved from condition 34]

- 46 The consent holder shall ~~install, to the satisfaction of the Council (Manager Resource Use), and~~ maintain telemetered soil moisture measuring equipment (Aquaflex ~~or similar~~) in each irrigation block and control block. ~~At least three measuring sites shall be required within one irrigation run for each irrigation block, to compensate for spatial variations in soil characteristics and application rate. Relocation and installation of any existing soil moisture measuring equipment shall be complete within six months of the granting of this consent. The installation of all new soil moisture measuring equipment required by this consent shall be complete within 18 months of the granting of this consent. The location and installation details of any relocated or new soil moisture measuring equipment to be installed shall be agreed upon with Hawkes Bay Regional Council (Manager Resource Use), prior to their installation.~~

[Moved from condition 35. Details re installation deleted as soil moisture monitoring (Aquaflex) was installed and commissioned.]

- 47 All irrigation records collected in accordance with this consent shall be summarised for each irrigation run within each irrigation block and provided to the Council at monthly intervals. All records and results of analyses collected in accordance with the conditions of this consent shall be provided to the Council (in electronic form) at monthly intervals, or at any other time that may be requested by the Council. Records shall be provided no more than seven days following the month to which they relate. Raw laboratory data shall be provided to the Council (Manager Compliance) on request.

[Moved from condition 37]

- 48 The consent holder shall log all complaints received. The log shall include the date, time, and nature of the complaint and the name, telephone number, and address of the complainant, weather information (including wind speed and direction), details of key operating parameters at the time of the complaint, the remedial action taken to mitigate the effects of the incident and the steps taken to prevent further incidents. Complaints shall



be reported to the Council within 24 hours of receipt and the log of complaints shall be made available to the Council on request.

[Moved from Condition 38]

49 Before 31 December 2000 and annually thereafter, the consent holder shall provide the Council with a monitoring report for the 12 month period ending at the previous 30 September. The format of the monitoring report shall be to the satisfaction of the Council (Manager Resource Use) and shall include (but not be limited to);

- a) A summary of analyses and records collected in accordance with the conditions of this consent; and
- b) A comment on the extent that each consent condition has been complied with.

[Moved from condition 39, and lead in date removed to reflect ongoing reporting requirement]

50 The consent holder shall submit to the Council (Manager Resource Use), by 31 December each year, an annualised nutrient mass balance, for the 12-month period ending at the previous 30 September. The nutrient mass balance shall provide an estimate of the annual losses of nitrogen (in kg N/ha) from each of the irrigation areas and crop management classes and the detailed calculations that were used to generate the nutrient mass balance.

[Moved from condition 47]



14 APPENDICES

Appendix One – Existing Resource Consents

Appendix Two – PDP Technical Assessment (June 2018)

Appendix Three – Integrated Land Management Plan

Appendix Four – ILMP Supporting Documents

Appendix Five – Cultural Impact Assessment

Appendix Six – Groundwater E.coli Monitoring Results

Appendix Seven – High Intensity Rainfall Design System: Takapau

Appendix Eight – Matrix of Compliance with Schedule XXII



14.1 Appendix One – Existing Resource Consents



14.2 Appendix Two – PDP Technical Assessment (June 2018)



14.3 Appendix Three – Integrated Land Management Plan



14.4 Appendix Four – ILMP Supporting Documents



14.5 Appendix Five – Cultural Impact Assessment



14.6 Appendix Six – Groundwater E.coli Monitoring Results

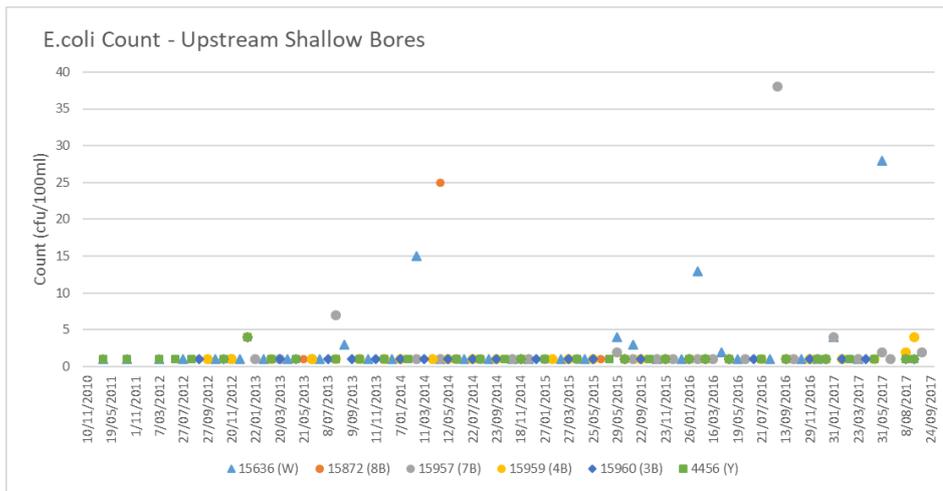


Figure 14.6(a): E.coli count – Upstream shallow groundwater monitoring bores (Nov 2010 – Oct 2017).

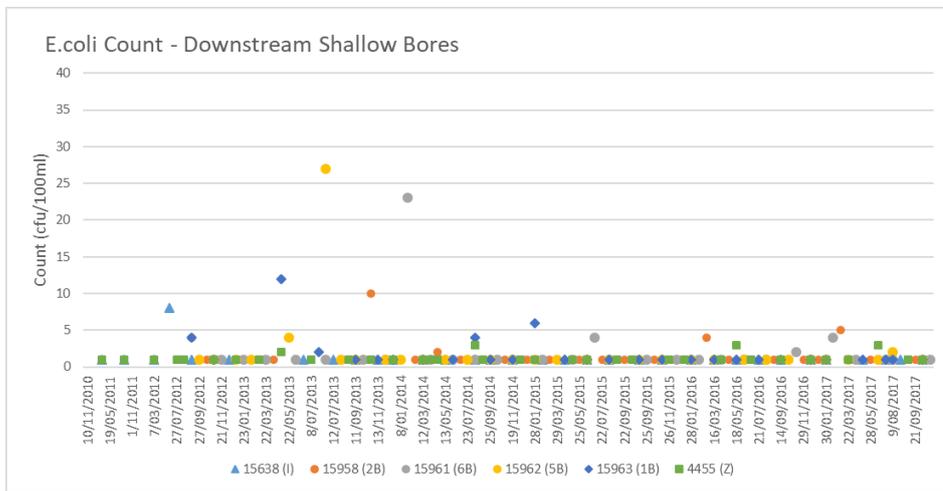


Figure 14.6(b): E.coli count – Downstream shallow groundwater monitoring bores (Nov 2010 – Oct 2017).

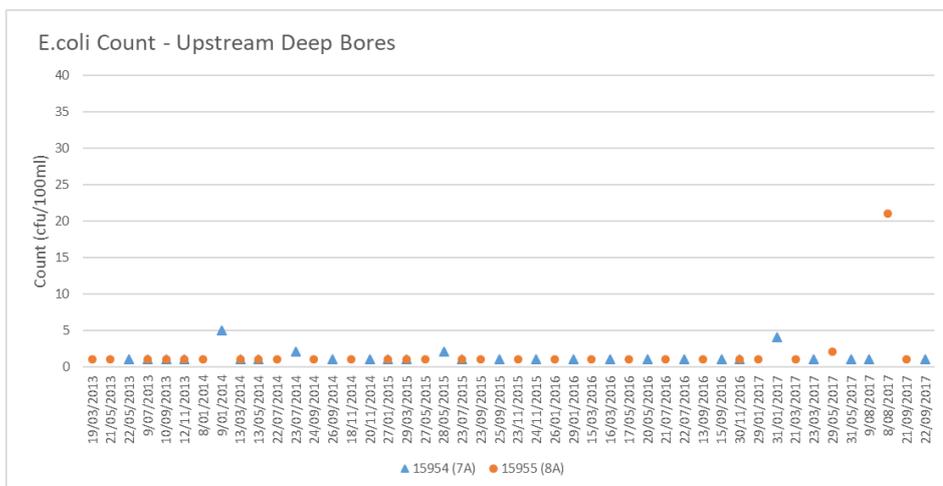


Figure 14.6(c): E.coli count – Upstream deep groundwater monitoring bores (Nov 2010 – Oct 2017).



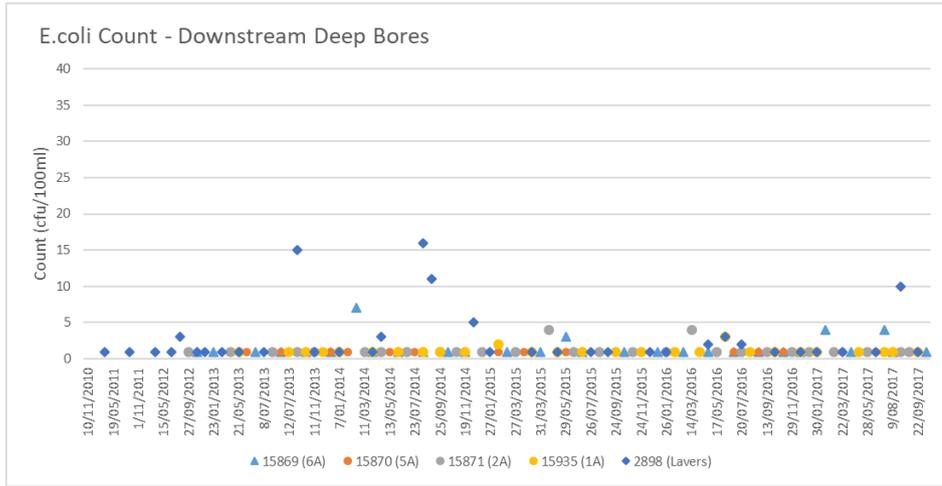


Figure 14.6(d): E.coli count – Downstream deep groundwater monitoring bores (Nov 2010 – Oct 2017).

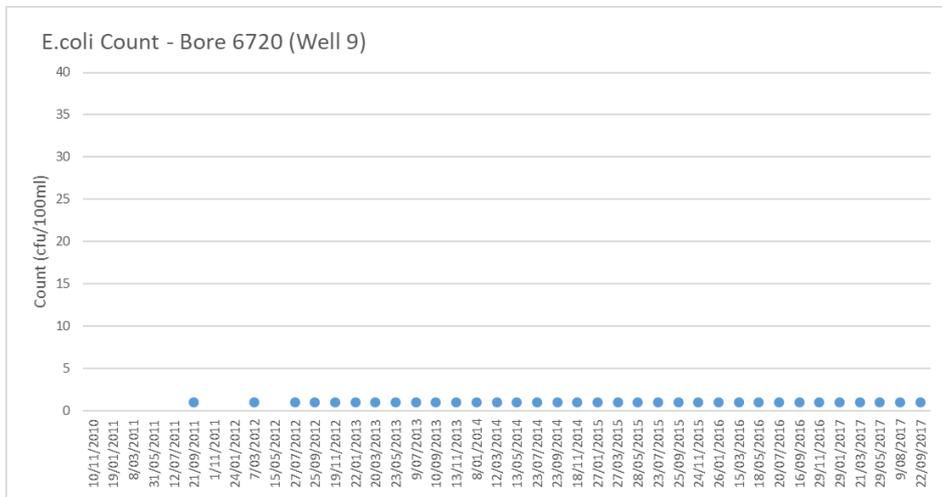
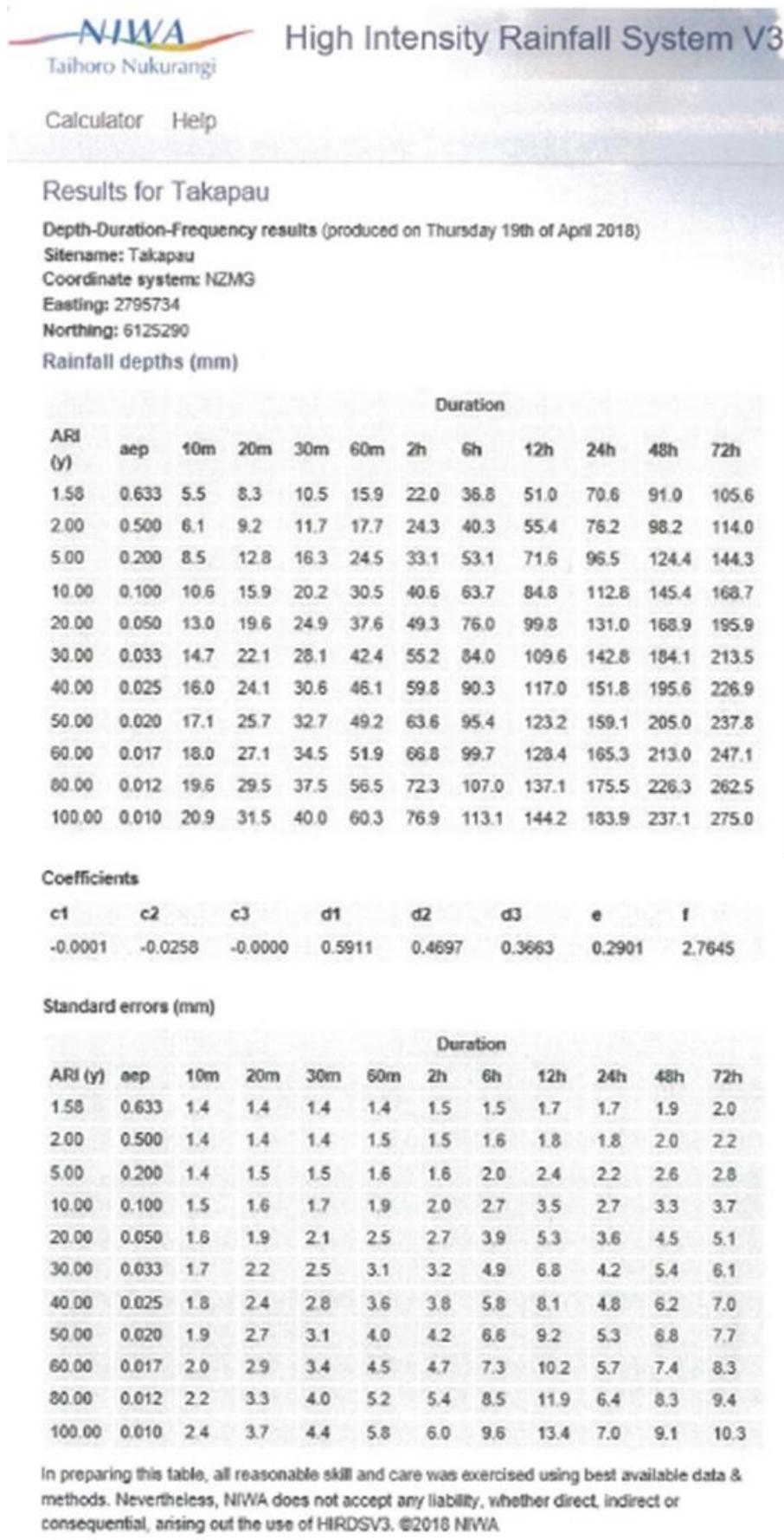


Figure 14.6(e): E.coli count – Bore 6720 (Nov 2010 – Oct 2017).



14.7 Appendix Seven – High Intensity Rainfall Design System: Takapau



14.8 Appendix Eight – Matrix of Compliance with Schedule XXII

